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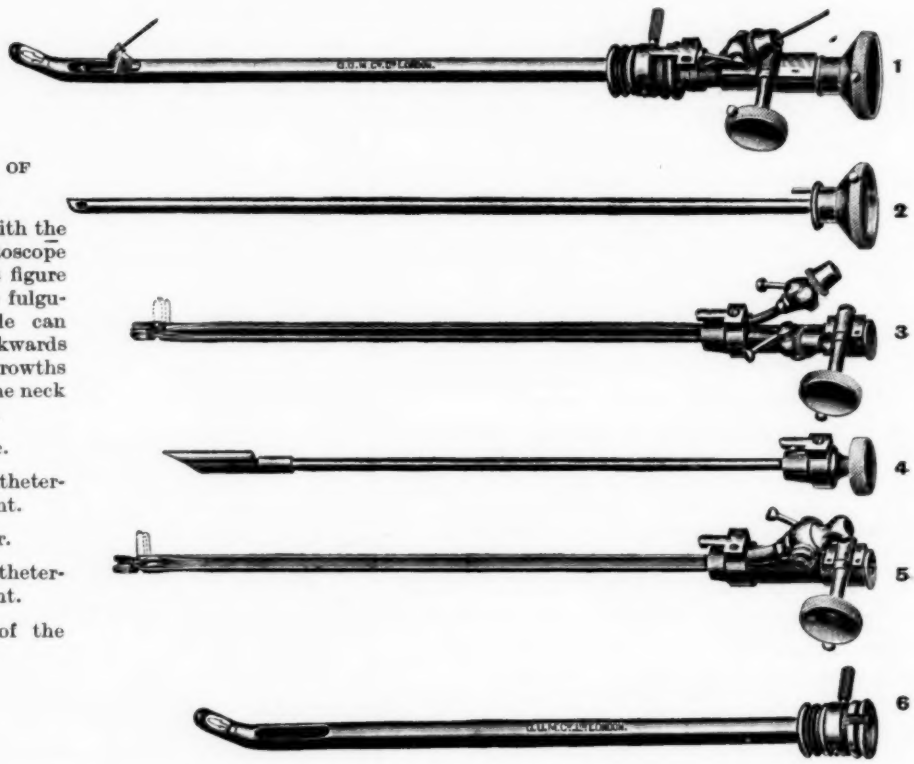

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EARLY STAGES OF CARCINOMA OF THE BREAST.

There is no pain in the early stage, when changes in the breast are but slightly marked, and require an expert to interpret them. To this statement there are few exceptions. The majority of patients present themselves when the nature of the disease is evident and the probability of successful treatment by any method doubtful. A series of photographs which have been taken of cases when they first came under observation proves this very decisively. From year to year it has been the same experience in hospital work—few have come unless there has been a change of marked character in the nipple or in the skin over the breast, or unless a pain has become so insistent that it can no longer be tolerated. In most of these advanced cases there was no loss of flesh, and the general appearance of the patients was unaltered.

A small proportion say that they did consult someone when they first felt a lump in the breast, but that they were reassured as to its nature—as it was small, discovered by accident when washing, and did not cause pain, they were told not to trouble any more about it. They were quite satisfied to follow this advice until they noticed an alteration in the appearance of the breast or pain supervened. The opportunity of giving permanent relief may then have passed for ever. Most of us have made mistakes in the diagnosis of carcinoma of the breast in its early stage. Possibly a first opinion was given after insufficient examination, but whatever the reason of the wrong diagnosis, what a tragedy was staged for a later appearance.

It is hoped that some remarks on the clinical aspects of the disease may lead to an earlier application for relief, and less hesitation in giving sound advice. I am inclined to the opinion that there is still too great a disposition to wait for special "text-book" signs. In this way lives are ultimately lost as surely as a man loses his patient with a perforated gastric ulcer if he waits for "loss of liver dullness."

TECHNIQUE OF EXAMINATION.

Every patient who comes with a complaint of something wrong with the breast must be examined thoroughly. Most mistakes are the result of imperfect examination. After preliminary inquiries regarding the duration of the trouble, the way in which it was discovered, the presence or absence of pain, personal and family history should be taken and attention paid to possible causes such as injury and previous disease of the breast. In order to examine the patient satisfactorily it is best to have the chest coverings removed, so that a full view of the part is possible; usually you are offered a keyhole opening with corsets only partly unfastened.

The room should be warm and a covering provided for the shoulders. The hands of the surgeon must not be cold. Look at the chest from the front with the patient standing and the arms hanging naturally by her sides. This gives you opportunity of comparing the two breasts, judging their outlines and comparative size, and changes in the skin and nipple. If the patient lifts her arms above the head, any adhesion to the pectoral fascia will be shown by a simultaneous raising of the affected gland. A satisfactory palpation can be made with the patient lying back in an easy-chair, or in obscure cases when she is recumbent on a couch. The supra-clavicular spaces are most satisfactorily examined when she is sitting in the chair, the examiner standing behind it. The axillary regions can be searched for glandular changes when she is standing, lying, or sitting if the muscular boundaries of these parts are relaxed.

If we suppose a case in which a solitary lump has been noticed in one breast (the woman is over 30 years of age, says that she is in good health, and looks it), on first examination we see no alteration in either, to the eye they both appear normal. The usual questions have to be answered which arise in the consideration of every abnormal swelling: Is it inflammatory in origin; if not, is it solid or fluid; is it simple or malignant? By far the most common of all malignant growths of the breast is carcinoma (scirrhus—spheroidal-celled, especially the atrophic variety). Bryant estimated that 83 per cent. of breast tumours were carcinoma. Commonly a slowly growing tumour of stony hardness, it gradually replaces the mammary tissue, invades surrounding structures, and affects the lymphatic glands.

The patient should be requested to point exactly to the part of the breast in which she has noticed a swelling, and examination should be gently carried out to ascertain if any of the characteristics of scirrhus are present.

First Stage of Tumour.

This may be called the first stage, and it is most important that some decision should be reached as regards the nature of the swelling. The signs which we look for are the hardness of the tumour, especially in its central part, where there may be some nodulation of surface. It is important to note if the outline of the hard area is irregular and fades gradually into the breast substance or is clearly defined. A thinning of the overlying subcutaneous tissue may be noted. There may be no tenderness, but many patients complain of aching at night-time after the examination. In rare instances small scirrhous growths may be rounded and clearly defined, although very hard. They sometimes appear pedunculated, but soon become fixed to surrounding structures. Their want of elasticity should compel suspicion of them. In these there appears to be a definite limiting membrane which for a time resists the usual infiltration of parts adjacent In coming to a conclusion as regards the signs mentioned it is advisable to place the patient on a couch whilst examination is made. The first two fingers of the left hand should be placed above and below the swelling whilst the hand steadies the breast over the chest. The tip of the forefinger of the right hand is then placed over the centre of the swelling and the question of fluctuation decided. No other tumours possess the same stony hardness as carcinoma if we except chondro-sarcoma, osteo-chondro-sarcoma, and sclerosing tuberculous mastitis, all very rare conditions.

If a patient comes with a lump which has these characters, it should be explored without undue delay.

Second Stage of Tumour.

There is nothing to signalise the passing from the first to the second stage of carcinoma of the breast, and it is usually in an advanced period of the second stage that patients present themselves. (Mayo says about

25 per cent. are already inoperable.) It may be difficult to find out when the disease really commenced, for so often the sufferers will not admit there was anything before they "accidentally" discovered it. Sometimes, however, they confess to a longer history on closer questioning, say they were afraid it might be cancer, but there was no pain, and therefore they did not like to make a fuss; they may also add that there had been little change, but because it did not go away they felt it might be best to make certain. One patient admitted that she had concealed her trouble from her husband because their finances were low; another said she did not believe in doctors, and therefore had not shown it.

There is one sign which is found comparatively early and which may be present before the skin gives signs of becoming adherent in front, and that is an elevation of the affected breast when the arms are lifted above the head. It is a proof that the tumour has become attached to the fascia over the muscle, and may be demonstrated when the growth appears to be quite unattached to deeper parts on ordinary examination. A growth which has commenced in the posterior part of the breast is the more likely to give this sign, and it is in obscure cases that it is most valuable. Later, an involvement of the pectoral fascia and muscle ensues; the growth may still be movable across the line of the pectoral fibres, but not when an attempt is made to carry it upwards and outwards. Still later it becomes quite fixed whether the muscle be contracted or not.

This fixation to the parts behind the breast may be unaccountably delayed, as shown by the case of a patient, aged 72, seen in consultation on account of recurring hæmorrhage from a large ulcer of the left breast. The tumour had been slowly growing for more than four years, but as it was painless, and the offensive smell when ulceration supervened could be controlled by applications, she had refused medical aid. There was a large lobulated growth of colour varying from red to purple; three of the most prominent lobules were ulcerated. From one of these there had been considerable bleeding for a month which was increasing in severity, so that she was markedly anæmic. The breast was freely movable, and no enlargement of the axillary glands could be felt. Operation afforded much relief, and recovery was uneventful.

The period at which glandular infection occurs is unknown. Experience has proved the danger of not removing the axillary glands in all cases, although disease of them cannot be demonstrated, no matter how recent the history given. It is not an uncommon experience to be told that they are not enlarged, when more careful examination shows that one or more are, but hidden under the anterior axillary fold, or placed high up in the axilla. It is a good plan to engage the assistance of the patient's friend, or medical attendant if present, and have the arm lifted from the side with the shoulder muscles relaxed. The left hand should be used for the right axilla, whilst the surgeon stands on the patient's left side and vice versa. The flat hand is passed to the apex of the axilla and worked slowly downwards along the posterior margin of the pectorals. The other side should then be examined in a similar way. Generally one or more hard glands can be felt, as they escape upwards from under the finger. This examination must be conducted gently, for the part is somewhat sensitive to pressure. Unusual hardness is of more importance than a slight increase in size, the large gland may not be diseased. Always compare the two sides.

Changes in the supraclavicular glands are not manifest in the early stage of most carcinomata of the breast, but may be demonstrated at a later stage or when the disease commenced in the upper segment. In this region the transverse process of the lowest cervical may be mistaken for a gland, also the posterior belly of the omo-hyoid.

One sees occasionally an extensive development of scirrhous growth in the axillary glands, probably in a stout well-nourished patient, when there is no primary lesion to be found in the breast. It is sometimes in the outer margin in what is called by Deaver the axillary tail, hidden by the mass of diseased glands, or it may have had its origin in an accessory mamma. The disease is never primary in the glands; cases are described where the primary growth, which had been overlooked, was situated in a duct, or had commenced as a small ulceration of the nipple (Lockwood).[2] After the examination of the axilla, it is well to look for nodular developments in the lymphatics, which pass between the breast and axillary glands. The glands which are placed between the pectoral muscles cannot be felt by palpation under ordinary conditions; even when the axilla is opened it may be impossible to feel them. Hence, one of the chief reasons for removal of the pectorals in all operations which aim at eradication of the disease. They are seen lying between the muscles after operation in early cases small, but diseased, and it has been necessary to remove the muscles some weeks after amputation of the breast and clearance of the axilla by others, because of renewed growth invading them from the glands. Early extension to the skin, making it adherent, is demonstrated by lifting the overlying skin between finger and thumb, when it dimples. Later it is adherent over a varying area and cannot be lifted, the growth has infiltrated it. Other changes ensue in scirrhus of the atrophic type, and dimples, grooves, and depressions of varying size and shape form. These are shown in photographs, and are present in the great majority of our hospital patients, when they first apply. A groove may be quite extensive, and it is found that the nipple is not only contracted but concealed in it, or the depression may be in the lower part of the breast and of such a shape as to suggest that the pressure of a corset may have had something to do with the causation of the growth. (Fig. 2.) This particular groove is uncommon.

As these changes develop in the skin and subcutaneous tissue, diminution in size takes place in the breast and nipple, the extent of which will vary with the position of the growth and the rate of contraction. In the atrophic form growth may progress very slowly indeed, one of the characteristic features being the small size of the resultant tumour, considering its duration. There appears to be a constant struggle between the fibrous stroma and the cellular elements; the former, prevailing, often prevents the development of a large tumour, causing a destruction of cellular elements, while it destroys the breast, which is replaced by an irregular, sullen, contracting and deforming deposit. The extremely retarded action of these growths is shown in Fig. 3, where the scirrhus had a history of more than 11 years, during which it caused no inconvenience and when removed was not larger than half a bitter almond. It was spheroidal-celled, but the axillary glands were still unaffected.

The nipple in the second stage will be drawn in from its original position and towards the growth, whilst an early sign is that of a cord passing between the two points, probably the result of permeation of a duct. The shape of the areola is changed, being narrowed on the side towards which the nipple is drawn. In the hypertrophic form (Fig. 1) of spheroidal-celled carcinoma where the tumour is more cellular and prominent, the skin is soon infiltrated with cells, which gradually change it into a part of the tumour with alteration in colour and tendency to break down. The nipple may also be much enlarged in every direction and hardened.

Various cystic and other changes may take place in carcinomatous growth, and a mucoid or colloid degeneration develop. A cyst may be formed as the result of breaking down of a quickly-growing tumour. There are also several instances known of the formation of spheroidal-celled carcinoma in what appears to be a simple cyst. The following instance is instructive:—

A married woman, aged 52 years, had a two years' history of enlargement of the outer segment of the right breast. This had been painless and consisted of two or three large bulging cysts. There was no abnormal hardness in any part, the skin was freely movable over the tumour, and the breast over deeper parts. The axillary glands appeared normal. After removal some solid material was subjected to microscopical examination, and it was spheroidal-celled growth.

This case strengthens the plea for microscopical examination in all growths which have been removed from the breast. A nodular surface with a history of moderate rate of growth will suggest colloid or mucoid degeneration. One patient, aged 72, with colloid carcinoma of right breast and glands, had undergone removal of the left half of the tongue nine years previously for epithelioma. She could talk well, and there were no signs of recurrence.

True suppuration may occur accompanied by the usual signs of inflammation, and an abscess may require incision. That it is not a simple pyogenic abscess is shown by the history and the excessive hardness of the surrounding parts. Two instances only have come under my notice.

Third Stage of Tumour.

The third stage, that of ulceration, supervenes sooner or later after the skin is involved. The extent of it will vary immensely and there may be more than one ulcer, usually without much fungation. Handley states that on an average ulceration commences two and a half years from the time when the disease was noticed. Three varieties are met with:—

(1) In which several superficial ulcers form on a breast extensively invaded by scirrhous growth. The gland is very hard, the skin thin where it remains, and fixed. This variety (Fig. 5) resembles the appearance produced by extensive tuberculous disease. Compare with Fig. 11.

(2) In Fig. 7 the ulcer has hard raised edges, is clearly defined, the surface is granulated, discharge slight, base fixed; there was no pain.

(3) A more common type of ulceration is shown in Figs. 6 and 10. It differs from the others inasmuch as the surface is occupied by a mass of cell growth which outstands boldly from the tumour. The tissues around are hard and the skin infiltrated; the skin is mostly carried forward irregularly at the circumference of the protrusion, portions having so far resisted complete destruction. This type of ulcer is liable to irregular sloughing, and may become very offensive.

Another distressing condition observed was that of a woman with advanced carcinoma of long duration. The surface of the enlarged breast was covered with papillomatous growths, which partly concealed irregular ulcerations, from which a continuous flow of thin acrid fluid of very offensive odour came. No antiseptic could quite overcome this, and a most disagreeable smell pervaded the whole house. She had much pain and was very cachectic.

It is mostly in this stage that proofs of extension of the disease are manifested by increase of the pain, fixation of the breast to the chest wall, enlargement of the supraclavicular glands, and solid œdema of the arm. Œdema of the surrounding skin gradually extends as an intractable thickening and the appearance known as "peau d'orange" is seen (Fig. 4). Sometimes small nodules form in the skin near, and multiply. There may be a general infiltration, slowly extending and stiffening the skin, until the patient is hide-bound, or fixed "en cuirasse." This may occur without signs of cachexia, but is usually associated with it.

DURATION OF LIFE.

The question is not infrequently asked as to the duration of life in carcinoma of the breast, and it is unwise to prophesy. The average is given in some of our text-books as three years, but it is wrong to be too dogmatic in any case. There are few surgeons who cannot point to some instance in which prediction of a rapidly fatal result has been falsified by the subsequent history of the case.

Some years ago an unmarried patient of 84 was seen in consultation who had been suffering for more than 20 years. She showed a large characteristic ulcer measuring about 4 inches across, which replaced the left breast. It was adherent, shallow, with irregular outline, sloughy surface, and somewhat offensive odour. There was also considerable induration in the neighbouring parts from irregular growth. The glands were slightly enlarged and hard. She was of spare figure, but energetic, and had recently been in the city by omnibus without an attendant. There was comparatively little pain throughout the illness, which terminated as a result of bronchitis about a year later.

Handley [3] mentions a case of 40 years' duration.

Discharge from the nipple is not very common in spheroidal-celled carcinoma, but is occasionally seen. The importance of this symptom is difficult to estimate in the absence of any evident change in the breast. It is mostly described as a scanty thin discharge of yellowish colour. A discharge from the nipple may not be caused by a malignant growth, and it may be years before any change in the breast gives a clue to its origin.

A multipara, aged 54, had noticed a discharge from the right nipple for several years. A small swelling had been noticed in the breast for 12 months—which had not increased much in size. This proved to be a chronic proliferative mastitis with cysts.

In a multipara, aged 35, a chronic discharge was associated with the later formation of a swelling above the nipple. This was a simple cystic dilatation of a large duct, without growth in its interior or in its walls.

If pressure over a certain point of the areola increases the flow, and still more if the fluid becomes blood-stained, there is a strong probability that a papilloma is growing in one of the larger ducts, although no tumour is felt. It may be that the growth is a duct or villous cancer. These growths have been regarded by some as less malignant than the other forms of cancer of this region. Perhaps the appearance of the discharge makes the patient seek for advice earlier, and be more ready to accept it. When there is only the occasional escape of a few drops of blood from a nipple, and pressure does not increase the amount, especially at the menopause, it will be advisable to try ordinary remedies and watch the case.

PAGET'S DISEASE.

The nature of Paget's disease, or eczema of the nipple, has been the subject of numerous investigations; some, especially two recently published, are most convincing (Handley,[4] Cheatle[5]). From the careful and thorough examination of specimens removed by operation these investigators have come to definite conclusions: (1) that the disease is carcinoma; (2) that it is primary in the breast epithelioma.

The appearance of the milder form of eruption is shown in Fig. 9. No change of a carcinomatous nature could be found in most careful examination after removal. In the second of longer standing there was a well advanced carcinomatous ulcer, which had developed to the outer side of the patch, from the underlying breast tissue (Fig. 10). In these instances the skin disease somewhat resembled psoriasis. The more vivid colouring of the definite eczematous type almost suggests malignancy when first seen. Paget wrote that in every case he had been able to watch malignant disease followed within two years. Acting on his advice I have always advised complete removal without delay. Most surgeons can recall cases which have come to their notice in which disastrous results have followed postponement of operation and the trial of local remedies.

It is a very unusual experience to find more than one spheroidal-celled tumour in the same breast. Fig. 8 illustrates its occasional occurrence. The specimen is in the Museum of the Royal College of Surgeons of England. The almost simultaneous appearance of carcinoma on both sides is not unknown, as also the formation of a tumour in the remaining breast after amputation of its fellow.

In acute mammary carcinoma (medullary inflamed cancer, Fig. 14) when the epithelial elements form the greater part of the tumour and the stroma is scanty and vascular we have a great contrast to the other forms. Growth is so rapid that the condition is frequently regarded as acute inflammation of the breast. This is especially so when it begins during the period of pregnancy or lactation. The breast becomes enlarged generally, unduly projecting, and fixed. The skin over it is dullish red in colour, hot,

œdematous, and adherent. "Peau d'orange" is an early change. The temperature rises, and not infrequently the disease is diagnosed as a puerperal mastitis and incisions are made under the impression that there is suppuration present. Dissemination, both local and general, is rapid, whilst operation is usually of little avail to arrest the disease. Mr. P. H. Mitchiner recently met with an example in a girl of 16 who was nursing her first child.

Carcinoma of the male breast is rare, probably not met with on an average in more than 1 in 200 (St. Thomas's Hospital, all cases, 8 in 1642).[6] The local signs are the same as in the female, but it is less difficult to diagnose as it is comparatively superficial. Other growths resembling it occur but are also uncommon.

A man of 44 was sent with a hard nodulated plaque under the right nipple. This was painless and could not be separated from the nipple. There was no glandular enlargement and but a week's history. The breast was removed. Microscopical examination, "fibrosis around the ducts and acini of the gland, like that in the female breast in early fibrosis."

Endothelioma in a multipara, aged 27, was described by Mr. H. B. Robinson.[7] He found two hard nodular masses in the breast with slight dimpling of the skin over one part. Three hard glands were felt in the axilla. The clinical appearances were those of spheroidal-celled growth, but the cut surface did not cup on section. It had a pink colour and well-defined margin.

Malignant disease of the nipple is usually secondary to a scirrhus which is centrally situated in a breast. Primary disease may be epitheliomatous, spheroidal-celled, or columnar-celled carcinoma. The rarity of the primary growth is shown by the statistical reports of St. Thomas's Hospital, 1880–1915, inclusive (primary carcinoma of breast 1642 in number), during which period only three instances were registered. One of them was a spheroidal-celled growth, patient aged 69, another that of a girl of 11 years of age This case was published in THE LANCET.[8] Examination after local resection showed a papilloma to be epitheliomatous, and the axillary glands were taken away at a second operation; they were normal. There is a photograph in my possession of another case, which was brought by Dr. W. Ecklin.

A married woman, aged 52, had noticed that the nipple had been "going in a bit" for about a fortnight. It was one-third smaller than the right, hard, on a rounded hard base which had a raised edge. One hard gland could be felt in the axilla. Mr. S. G. Shattock reported "a duct columnar-celled carcinoma."

The specimen is in the Museum of the Royal College of Surgeons of England.

Attention should be drawn to the advisability of making a general examination of the patient. Although the local disease may appear operable, you must ascertain the absence of secondary growths in the chest, liver, and skeleton. These may have given no symptoms to which the patient draws attention, but the frequency with which secondary carcinoma invades the spine should lead to a careful examination of that part where there is complaint of weakness in walking, pains in the back, or girdle pains. A growth in the femur is often first revealed by fracture of the part, whilst in the humerus the formation of a swelling with but little pain may occur and you may unexpectedly find abnormal mobility at that point. The urine should be examined, as in all operation cases albuminuria may be a serious complication It is possible that those suffering from diabetes may be so improved by the administration of insulin as to permit of operation. But bad results have followed interference when this complication has been met with in the past, even when treatment has temporarily got rid of all traces of sugar from the urine. When the diabetic condition was unsuspected coma has supervened in a day or two, and when apparent recovery under treatment has been obtained, sloughing of the cellular tissue with a return of sugar in the urine ended in death from exhaustion.

DIFFERENTIAL DIAGNOSIS.

The swellings which it may be difficult to distinguish from early carcinoma of the breast are cysts, fibro-adenomata, and chronic inflammation. When the cysts and fibro-adenomata are associated with a local inflammation the diagnosis becomes at times quite impossible. A patch of chronic inflammation may be difficult to define, is often tender, and there may be more than one. The axillary glands are not hard, and if enlarged are not markedly so. There are no changes in the overlying skin, and no adhesion to pectoral fascia. Sometimes there is pain of a neuralgic character. A single cyst in such an area may have an extremely thick wall which, with the surrounding inflammation, conceals the presence of fluid. The tension in such a cyst may be so great that when a puncture is made into it, the fluid scatters for yards around. Peripheral mastitis is frequently seen on the axillary border, affecting both breasts in similar manner. Much pain is caused by it. There is an irregular collection of small swellings which are tender to pressure. A chronic abscess or a galactocele may, for a moment, cause hesitation in giving a decided opinion.

A fibro-adenoma may also occupy a position which, surrounded by inflammation, renders diagnosis impossible. Much will depend on the absence of local

Descriptions of Illustrations on Special Plates.

FIG. 1.—Spheroidal-celled carcinoma, right breast and glands, 16 months' duration. Patient aged 37.

FIG. 2.—Spheroidal-celled carcinoma: skin involved, with "corset groove." Patient aged 50.

FIG. 3.—Spheroidal-celled carcinoma, atrophic. Patient aged 52. Small lump noticed in right breast 11 years, dimpling of skin seven years. States "more dimpling now, but lump smaller."

FIG. 4.—Spheroidal-celled carcinoma, ? 12 months' duration. Retraction of nipple, contraction of skin, peau d'orange. Patient aged 56.

FIG. 5.—Extensive spheroidal-celled carcinoma, with pigmentation around ulcers, ? 12 months' duration. Patient aged 35.

FIG. 6.—Spheroidal-celled carcinoma, atrophic, duration four years. Nipple destroyed by ulceration. Patient aged 70.

FIG. 7.—Spheroidal-celled carcinoma, with ulceration. Patient aged 36. Duration, tumour ? 8 months, ulceration three months.

FIG. 8.—Spheroidal-celled carcinoma, two growths. Patient aged 50. Duration, nine months' outer growth, seven and a half months' inner. Nipple drawn in and towards inner growth; ulceration of outer growth; skin over inner growth infiltrated; glands diseased.

FIG. 9.—Paget's disease, eczema of nipple, six months' duration; nipple partly destroyed. Patient aged 47. Sore nipple, December, 1906, whilst suckling; abscess opened March, 1907, followed by eczema. Clinical laboratory report: chronic inflammation, no carcinoma.

FIG. 10.—Spheroidal-celled carcinoma, with ulceration, and Paget's disease of nipple. Patient aged 65. Duration, eczema seven years, tumour six years, ulceration one year.

FIG. 11.—Tubercle of breast. Patient aged 26. Six years' history of abscess, no history of tubercle. Breast much scarred, nipple retracted, glands enlarged.

FIG. 12.—Round-celled sarcoma of breast, not infiltrating, duration two months. Patient aged 13. Side view, showing clean outline of tumour pushing the skin forward.

FIG. 13.—Melanotic fungating sarcoma of breast, appearing soon after a blow on the breast. Duration 14 months, patient aged 36. Growth almost painless, pedunculated, and easily removed.

FIG. 14.—Acute medullary carcinoma. Duration three months, with pain. Patient aged 38. Large, œdematous, firm breast outstanding from chest wall; nipple and areola less prominent; skin shining with red streaks in it. Axillary glands diseased. General health good.

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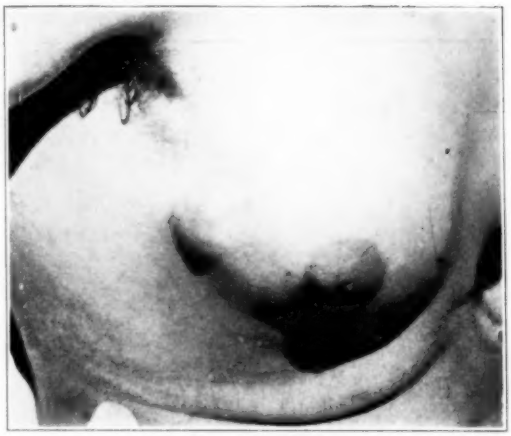

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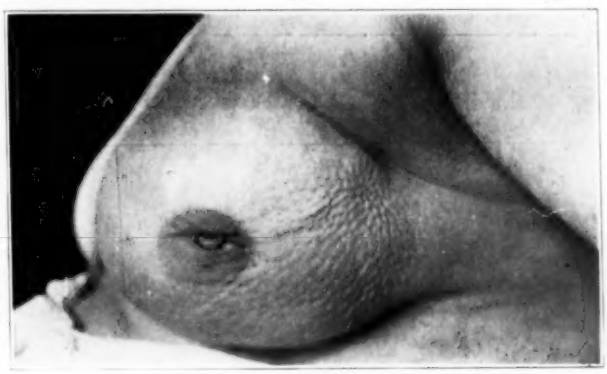

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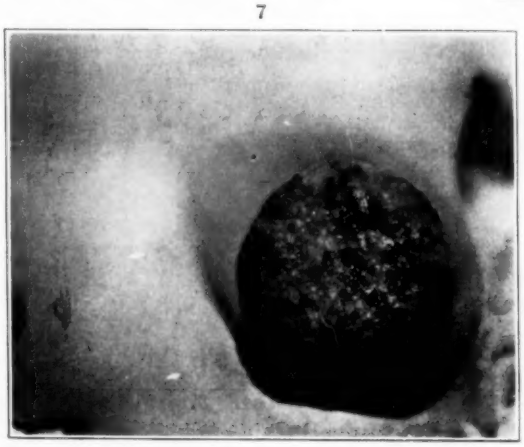

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MR. W. H. BATTLE: CLINICAL DIAGNOSIS OF CARCINOMA OF BREAST.

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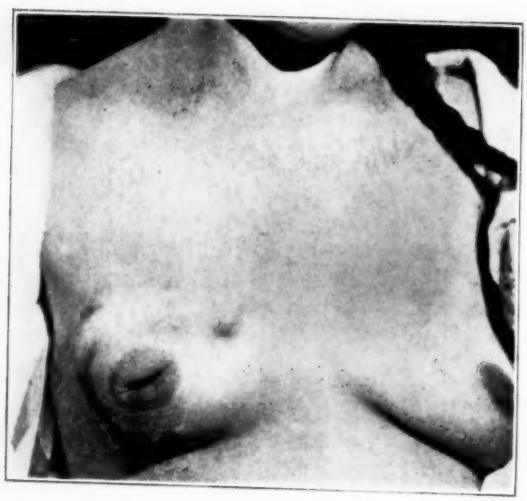

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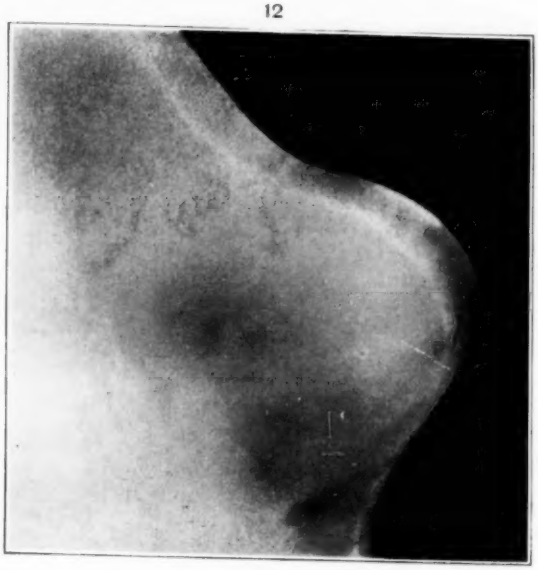

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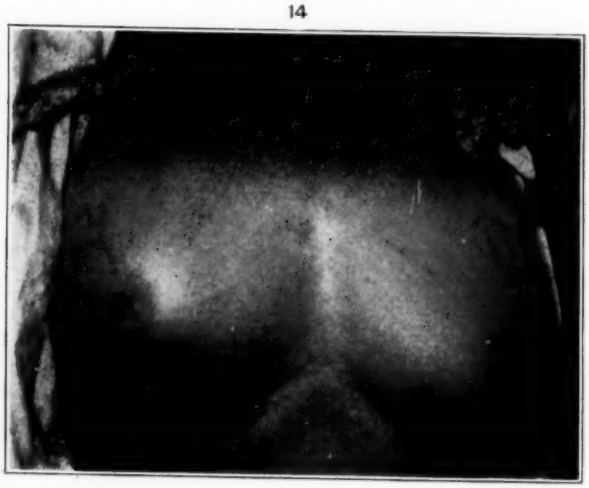

signs of carcinoma, which should be present judging by the duration of the disease and the size of the swelling.

Sometimes a simple cyst bursts through overstretched skin and a fungating sore develops. The riot of growth is much more evident than in carcinoma, and microscopical examination will clear up the case. If the tumour is a large one of slow growth the probability of carcinoma is remote. Simple growths do not produce the deformity and surrounding changes that are met with in scirrhus.

It is advisable to explore small swellings (especially after the age of 30) about which there is doubt, an incision into or through it, should show even in small malignant ones, a cartilaginous resistance to the knife, a hard edge, a cupping of the surface, on which there is the appearance of the unripe pear. No one can mistake this section for anything else if he has had any experience, but doubtful tumours not giving all these characteristic signs should be submitted to microscopical examination at once. I have for some years sent sections of all breast tumours to a skilled pathologist for independent report—no matter how innocent they might appear. The fundamental sign (Quervain) is "the movability of the tumour in relation to the rest of the breast tissue," the duration of the growth is also important.

A mistake between tuberculous deposit and carcinoma is not usual in the first stage; the local enlargement is insidious, and little may be noticed to excite alarm until suppuration ensues. A primary focus may be found elsewhere. Deaver states that patients who are suffering from tubercle present themselves on an average 12 months after it has begun, and carcinomatous cases apply 30 months after its known commencement. In both there may be glandular enlargement. When there is a more extensive infiltration of the breast with suppuration the destruction may be considerable, but even here the undermining of tissues where sinuses have formed, with thinning of skin and pigmentation, can hardly be mistaken for carcinoma, although there may be a superficial resemblance to one form of carcinomatous ulceration. Compare Fig. 11 and Fig. 5. In tubercle there may be destruction of the nipple when the mischief has commenced near it. As already mentioned, any deposit of tubercle which has undergone calcareous change is very apt to be mistaken for carcinoma. The attention of the profession was first drawn to the occurrence of tubercle in the breast by Sir Astley Cooper,[9] but was practically ignored by writers on this subject until Mr. S. G. Shattock[10] drew attention to it in 1889. During the past 20 years many have recorded investigations on this subject.

In actinomycosis the disease is only recognised by the discovery of granules in discharge from an abscess.

Syphilitic disease of the breast is rare. Primary chancre may resemble a primary malignant growth of the nipple.

In one instance, that of a grandmother, aged 46, who was seen because of a very hard-edged ulcer extending to the left nipple with glandular enlargement, it was discovered at a later period when a secondary rash had developed, that she had been trying to keep a grandchild quiet by putting him to the breast. He had snuffles and other symptoms of congenital syphilis. The nipple had been sore for more than a month. The youngest child was aged 10 years.

This case emphasised the importance of a complete exposure of the chest in spite of remonstrance on the patient's part. The development of gummata in the substance of the breast occurs in three ways:[11] (1) The breast becomes swollen, firm, and irregular masses can be felt and seen; (2) one or two lumps form, and the rest of the gland remains healthy; (3) a large gummatous mass forms. A diffuse syphilitic mastitis leading to fibrosis and enlargement is not unknown.

One example of tertiary disease manifested itself by the formation of a small lump in the mammary tail and many hard lumps in the axilla. The patient was a multipara, aged 57, who had noticed a bruised feeling for 14 days, and on examination had discovered the swelling in the breast margin and numerous lumps under the arm. The segment of breast involved was excised and axilla cleared of many glands. The larger ones on section resembled sarcoma, and were of pinkish yellow appearance. Some of them were quite large. Microscopically, they were gummatous undergoing fibroid changes, the smaller glands being partly replaced by adipose tissue. There was a history of thrombosis of a large vein which had cleared up after a course of iodide of potassium.

Sarcomata of the breast may present some resemblance to carcinomata: (1) in the early stages, (2) when the skin has given way and there is exposure of the growth, and (3) when the tumour has undergone unusual changes. A sarcoma grows rapidly and when first seen has attained a size which in carcinoma would be characterised by adhesion to the skin and extreme hardness with definite involvement of the axillary glands. The sarcoma is more elastic to the touch, well defined, and instead of infiltrating the skin pushes it before it. It is shown in Fig. 12, which is a contour photograph taken by means of the X rays to demonstrate this.[12]

A girl, aged 13, had a swelling the size of a tangerine orange, described as "adeno-sarcoma," noticed for two months, and following a blow. She was again in hospital two years later and a vascular-looking tumour was removed from the left breast. This was reported as "adenoma." Four years later the left breast was removed on account of the formation of two more growths in it. These showed a pink firm section but microscopic characters of adenoma. The glands were not enlarged.

Another illustration, Fig. 13, shows the manner in which a sarcoma fungates when the overlying skin has given way, and no longer exerts pressure on the soft rapidly-growing mass. It was a round-celled growth which followed a blow received 14 months before.[13] The breast was small and the woman, aged 36, was anæmic and very low as the result of repeated hæmorrhages.

Some sarcomata develop cartilaginous change, and so resemble hypertrophic carcinoma in their unusual hardness, but they are usually of more rapid growth, characteristic invasion of surrounding parts is absent, and the hardness is mostly distributed in an irregular manner. In osteo-chondro-sarcomata—in which true bone may be formed—the sensation produced is much like touching a metallic foreign body under the skin. An example of this excessively rare tumour was shown at a meeting of the Pathological Society in 1886.

The tumour was removed by Mr. Mackellar from a woman, 73 years of age. She had noticed a lump in the right breast six years before; it was then the size of a pea and did not grow for two years. It increased to "hazel-nut" size by the end of five years and to that of an orange later on without pain. The nipple was retracted. Skin adherent, red, and tense over the inner part, which was excessively hard. One small hard gland was felt in the axilla.

As a rule, the glands are not affected in sarcoma. Sometimes they are rapidly growing, lobulated, soft, and encapsulated masses.

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14. Battle, W. H.: Trans. Path. Soc., xxxvii., 473.

BUCHANAN HOSPITAL, ST. LEONARDS. — The foundation-stone of the new women's wing of this hospital was laid on Dec. 17th last. The building and equipment is estimated to cost £7000. The new wing is to be named after Dr. Clowes Pritchard. The hospital was originally opened in 1884 and an out-patients' department was added in 1899. Between 300 and 400 in-patients are admitted to the hospital yearly, the number of out-patients exceeding 600.

PNEUMONIA AND ITS COMPLICATIONS.

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PNEUMONIA is a disease which has changed more than any other since I was a student. Then most of the cases were lobar; since the 1890 epidemic of influenza, the broncho-pneumonic and mixed types have been much more common.

A typical lobar case begins suddenly with a rigor, or in children sometimes with convulsions, has a very high temperature for five to eight days, and ends with a crisis, the temperature falling to below normal in less than a day. The face is flushed, respirations are rapid, the pulse should not be quickened quite in proportion to the rise of temperature. For the first day or two there may be none of the physical signs of consolidation, but the affected side of the chest will move less than the other, and the note on percussion will be less resonant. The breath sounds will be weaker than normal, but, though there may not be a suggestion of tubular breathing, vocal resonance is often a little increased. It is in this stage that a right-sided pneumonia may be confused with appendicitis, a patch of diaphragmatic pleurisy which is out of reach of auscultation, giving rise to pain shooting down towards the right iliac fossa, and to rigidity of the abdominal wall; but, in pneumonia, respirations will be rapid, and the right chest will not be moving as well as the left; also, a rectal examination will not reveal any tenderness in the right iliac fossa.

Pneumonia starting in the apex of the lung is, for some unknown reason, more severe than the more usual basal cases. The patient is generally very delirious and there is a greater tendency to hyperpyrexia. In some cases of hyperpyrexia there is a rapid diminution of the physical signs of consolidation, liquid crepitations occurring, and one theory advanced is that there is an unusual absorption of toxic products from the alveoli into the blood, and that this is the cause of the hyperpyrexia. A low temperature in a case with extensive physical signs is of grave import, implying defective resistance. Sometimes in a severe case there is a fall of temperature suggesting a crisis, but the pulse increases in rapidity, and the patient becomes pale and blue, usually dying. The fall of temperature is due to the breakdown of the body's reaction to the bacterial toxins. Often for a day or two before this the pulse is intermittent, which is a bad sign in pneumonia. On examining the blood one should find a leucocytosis, which may be even as high as 50,000, so that blood counts are not very useful as a guide to empyema. A high leucocyte count means a favourable case as a rule, and a low count a bad case. After a crisis the count falls, and, if it then begins to rise again, it does indicate empyema.

Broncho-pneumonia.

Broncho-pneumonia usually starts more gradually than lobar pneumonia, the temperature is not so high, and remits more in the morning. In influenzal epidemics the high temperature of the beginning of an attack may fall for two or three days, and then on the third or fourth day broncho-pneumonia may start and the temperature rise again with increasing illness of the patient. As to physical signs, medium crepitations are heard at the base of the lung, and spread upwards rapidly. Patches of finer crepitations develop, followed by tubular breathing. Dullness is not so absolute as in the lobar form. The area of lung affected may go on increasing for several days. The disease may last ten days or a fortnight, or even longer. In children there is a form of tuberculous broncho-pneumonia which is not distinguishable by physical signs from the pneumococcal, except in that the spread is slower and there is no resolution. It is important in a suspected case to get some sputum for examination; this is always difficult in children.

In influenzal epidemics very severe types may occur. One which might be called the hæmorrhagic begins with high temperature—104° or 105° F. The tongue is quickly dry and brown, and about the third or fourth day there is a profuse hæmoptysis, half a pint of blood or more being coughed up at a time. This is often preceded by severe pleuritic pain. I think that these cases are invariably fatal. Post mortem the lungs resemble those of pneumonic plague, large black blood-clots being scattered through the much congested broncho-pneumonic lung. Another set of cases might be called œdematous; in them, also, the mortality is very great, the temperature is not at all high, but the pulse and respirations are rapid, and the patient is obviously very ill from the start. Crepitations spread all over both lungs from bases to apices, and are very numerous. After only a few days' illness, in most cases, the face becomes a pale bluish-grey and death takes place within 24 hours of this change.

Pleurisy and Empyema.

Pleurisy occurs with all types of pneumonia, and often there is effusion, but aspiration is not advisable before the temperature falls unless there are signs of displacement or embarrassment of the heart, the fluid usually being absorbed. It is, however, a useful precaution, toward the end of the first week, to draw off a syringe-full to see if pus is developing, especially in the case of children, since in them breath sounds can be heard through pus fairly distinctly.

The most ordinary complication is, of course, empyema. In most cases it is quite easy to diagnose; an increasing rise of evening temperature with morning remissions and dullness and silence at the base of the lung with displacement of the heart, pointing definitely to it, but in quite a number of cases matters are not so simple. Difficulties may occur from the situation of an empyema. It is not altogether uncommon between the lobes of the lungs. Sometimes it develops on the side opposite to the pneumonia, which adds to the difficulty of diagnosis. If untreated such an empyema may burst into a bronchus, and after weeks of coughing, sometimes of fœtid sputum, may clear up, or chronic bronchiectasis may result. Physical signs are very varied, depending on which direction the empyema takes towards the chest wall.

In one case that I have seen a man had recovered from a left-sided pneumonia, and had been actually back to work; he had a severe cough and a good deal of expectoration. The temperature was 100° at night, there was dullness in the second and third right spaces in front, and diminished resonance below; bronchial breathing at the apex, distant tubular breathing in the second and third spaces, weak breathing below with coarse crepitations. Over the right back breathing was bronchial and rather weak in the upper half, but there was no dullness. An X ray photograph showed a pear-shaped shadow in the second and third spaces, with some shading of the lower lobe.

Another case was admitted under my care in the 2nd Eastern General Hospital with what appeared to be a large empyema on the left side, there being dullness and silence from the spine of the scapula to the base. Major Buck operated in the usual situation, below and external to the angle of the scapula, but the amount of pus was unexpectedly small and there was no improvement in the general condition, the temperature remaining hectic. A few days later I found that the lower part of the back was slightly resonant, but that just below the level of the spine of the scapula there was an area of absolute dullness about three inches in depth. An aspirator inserted here withdrew much pus, which, however, reaccumulated, and Major Buck removed a portion of the fourth rib between the scapula and the vertebræ and opened a large empyema between the upper and lower lobes of the lung. The operation was one of some difficulty owing to the depth of muscle. In this case the original empyema was evidently inter-lobar, and some of the pus had leaked down over the lower lobe, where it was found at the first operation. The man made a good recovery.

Besides these, I have seen three other cases of inter-lobar empyema, which have been subsequently cured by operation. One of these, however, was not preceded by pneumonia, but by a fall on the chest some weeks before. Mr. Fletcher opened this through the upper axilla and a cure resulted. When much pus collects in an inter-lobar fissure, the lower lobe of the lung becomes compressed and dull, leading to the belief that there is an ordinary empyema. In the earlier stages there may be dullness in the second and third spaces in front, or a band of dullness at the level of the spine of the scapula, and sometimes high up in the axilla, and diminished resonance over the lower lobe. On auscultation over the upper lobe there is weakened bronchial breathing from pressure; over any dull band very weak breath sounds, and below, generally weak and rather bronchial breath sounds with some crepitations. Unfortunately, the physical signs differ in every case. The best place to insert a needle is in the upper axilla with the arm at right angles to the side; this is the seat of election for operation, there being no muscle in the way.

A very rare position for an empyema is between the mediastinum and the lung. An elderly man had a very severe influenzal pneumonia of the left lung, during which he was desperately ill. He had a good deal of pleurisy over the left lower lobe. After a fall the temperature rose again, and the lower lobe of the lung, which had appeared to be clearing, became dull and silent, but no pus was found by exploration. After some days he suddenly coughed up a quantity of pus and continued to do so, the temperature meanwhile remaining hectic, and the lung dull and silent. The patient was then seen by Sir William Osler, who found a strip of resonance about 3 inches broad, just to the left of the vertebral column over the angles of the sixth, seventh, and eighth ribs. He pointed out that, as the patient was spitting up pus, there was probably a pyo-pneumothorax, and he had a needle put into the lower part of the resonant area just external to the angle of the eighth rib. Pus was at once obtained. Later, a piece of rib, just beyond the angle, was resected, and a large empyema opened which extended forward to a depth of 8 inches, but was bounded externally by the lung which was completely adherent to the parietal pleura, and collapsed, dull, and silent.

Another rare position is between the base of the lung and the diaphragm; of this I have only seen one case. After a right-sided pneumonia, the temperature and condition of the patient pointed to empyema, but, though the lower half of the right chest was wanting in resonance, it was not as dull as in empyema, and redux crepitations could be heard practically to the base, but I found a dull and quite silent area about 3 inches broad over the lower ribs in the posterior axillary region. A needle inserted here withdrew pus, and Mr. Fletcher in operating found a largish empyema between the lung and the diaphragm, with the lung firmly adherent to the chest wall above it.

Abscess of the Lung.—Suppuration of Bronchial Glands.

Abscess of the lung is another complication. A soldier was admitted under me during the war with a very severe broncho-pneumonia mainly of the right side, tubular breathing being most marked between the middle of the scapula and its angle. On the thirteenth day he suddenly spat up about an ounce of blood, and the following day his sputum became most offensive. A small patch of cavernous breathing could be heard in the centre of the tubular area. A radiograph taken by Captain Morton showed a round abscess cavity surrounded by inflammatory thickening at the level of the sixth rib. He was treated by inhalations of creosote, carbolic, and iodine from a Burney Yeo inhaler for several hours every day, and made a good recovery. Results of lung abscess are not usually so satisfactory, as they are generally due to gangrene of a larger area than in this case, and the mortality is very high. Surgery so far has not been very successful in such cases.

Suppuration of bronchial glands is a very rare complication, of which I have only seen one case, the diagnosis being made by my father. A week after the subsidence of a very severe pneumonia in a boy, the temperature began to rise, and a paroxysmal cough came one, very like whooping-cough, but the spasms lasting very much longer, even two or three hours, and being only controllable by light inhalations of chloroform. Eating and turning on to the right side provoked attacks of coughing. Vomiting was frequent. This sort of cough strongly suggested enlargement of bronchial glands. After four days of this condition there was a slight rigor with a rise of temperature to 104·2° F. On auscultation tracheal breathing could be heard over the upper sternum, and distant tubular breathing in the right first space near the sternum. Next day the heart was displaced to the left, and there was dullness in the second space. The temperature was hectic for the next five days, then signs of fluid began to appear at the right base. This was found to be only serous on inserting a needle. On the tenth day after the rigor he suddenly spat up half an ounce of pus, and coughed up some more during the day. The temperature at once fell. The suppurating gland had evidently burst into a bronchus. The heart only slowly regained its normal position, and the tracheal breathing disappeared. The fluid at the right base became absorbed.

Other Complications.

Pericarditis also is a rare complication, in some cases pus forming in the pericardium. Ulcerative or infective endocarditis may be set up by pneumococcus after pneumonia. It may be subacute, the temperature only being above normal two or three times in a week, and there may even be no cardiac murmur or only a mitral systolic, but the pulse is always quickened, and the patient is pale, ill-looking, and breathless, and often complains of shivery feelings, though there are no rigors. After some months this may become acute and end with emboli in the brain. In other cases there may be continuous pyrexia, with frequent showers of small emboli in the lower legs and forearms, and occasional infarcts in the lungs and intermittent albuminuria. Dr. Helen Boyle and I had the satisfaction of effecting a cure in such a case over a year ago by numerous injections of antipneumococcic serum, continued in spite of severe anaphylaxis.

Jaundice of a non-obstructive type, bile persisting in the stools, sometimes occurs in severe cases. A croupous colitis, accompanied by diarrhœa, is described by Bristowe and Osler. Post mortem a thin, flaky exudate is found on the summits of the folds of mucous membrane. Peritonitis as a complication is very rare, though pneumonia following on a pneumococcal peritonitis is not uncommon. Otitis media, mastoid suppuration, inflammation of the antrum, and other sinuses may occur.

Meningitis is not often met with in adults, but is not altogether uncommon in young children. It is a general inflammation of the meninges of the whole cortex. The early diagnosis is not easy, but it should be looked for when there is much delirium, by bending the head forward to see if the chin will touch the sternum, and by testing for Kernig's sign. If there is any suspicion a lumbar puncture should be done. This complication is usually fatal, but I have cured two cases by frequent injections of anti-pneumococcic serum, daily lumbar puncture, and large doses of urotropin. In one of these cases the cerebro-spinal fluid resembled the pus from an empyema.

Treatment of Pneumonia.

In the treatment of pneumonia it is most important that the patient should be kept as quiet as possible, since auto-inoculation takes place on any movement.

Nurses should be told that washing must be limited to a minimum. Many years ago in a case of pneumonia I had the patient's temperature taken just before the morning's elaborate ablutions, and again half an hour after their completion, and there

was a rise of nearly a degree, with very distinct malaise. On the next morning the temperature was taken at the same times without any washing of the patient, and no rise was shown. Sponging without moving is comforting and good.

For the same reason examination by the doctor should be as little disturbing as possible; percussion should be very light. After the diagnosis has been made, it is unnecessary to listen to the backs unless there are signs of fluid. The chest should be examined as far back as the posterior axillary lines without moving the patient, and, as long as crepitations and breath sounds are heard there, no serious amount of fluid can have accumulated. In the old-fashioned lobar pneumonia, with constant temperature between 104° and 105°, a large ice-bag continuously applied over the site of the pneumonia undoubtedly does good. In other cases antiphlogistine is beneficial, or, if there is much pain from pleurisy, this may be preceded by a linseed and mustard poultice.

As to specific treatment, a vaccine, if of the right type of pneumococcus and the correct combination of germs, may be very useful, if given early in the disease; but it is not safe in the very poisoned cases with low temperatures, as the negative phase may be too much for the patient. After the second day vaccines are not likely to be useful, since pneumococci are then usually circulating in the blood, and, if live pneumococci going through the glands will not produce antitoxin, it is unlikely that dead ones will. In delayed resolution, when the physical signs are not clearing a week after the subsidence of the disease, autogenous vaccines are of great assistance, also after operation for empyema they hasten the cure.

Many years ago I was told of the merits of Pane's anti-pneumococcic serum by the senior physician of Frankfort Hospital. Up to 1917 it was the most valuable remedy, but in the influenza epidemic of the autumn and winter of 1918 it was apparently useless, as also were the English and American serums; but the Pasteur Institute in Paris had prepared a serum by inoculating horses with all the germs of the spring epidemic of 1918, and the results of its use were marvellously good. Twenty cubic centimetres, repeated in from 12 to 24 hours, is usually sufficient, but a third injection may be necessary. Dr. Pane has since then followed the lines of the Pasteur Institute, and his serum is now quite effective.

Medicinally aspirin, first recommended by Dr. Alfred Scott, is undoubtedly valuable, but the doses should not be too large. I once saw, in consultation, a girl, who, just after the crisis, with a normal temperature was suffering from intense dyspnœa. There were no signs of fluid in the chest, and the dyspnœa reminded one of the air-hunger of diabetes. I found that she had been given large doses of aspirin, and concluded that it was a case of acidosis. Bicarbonate of soda by the mouth and rectum stopped the dyspnœa in a few hours, and the child made a normal recovery.

Quinine, given with aspirin, is also helpful, and this especially in post-influenzal cases. I have had good results with the creasote and iodide mixture, but patients dislike it. Ipecac. and iodide may be useful in loosening expectoration. Oxygen should always be kept ready. As a sedative at night Dover's powder is one of the best. In cases of intense poisoning Warburg's tincture is very valuable given by mouth or rectum, as, besides being a bactericide, it is a strong stimulant. It must be given in an alcoholic solution, such as port wine, since water precipitates the resins and destroys its efficacy. Hyperpyrexia should be treated by ice sponging or packing, and by large doses of Warburg's tincture.

It is very important to watch the heart. In the early stages of lobar pneumonia, if there are signs of over-distension of the right side of the heart, such as duskiness of the face, and marked epigastric pulsation, six leeches over the site of the pneumonia will have a good effect. If the pulse-rate is above 100 digitalis should be given regularly, but not in very large doses, and if up to 120 hypodermic strophanthin. Camphor hypodermically is also very useful.

PNEUMOCOCCAL INFECTIONS: THE BACTERIOLOGICAL ASPECT.[1]

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I feel strongly that a consideration of the causal organism of pneumoccocal infection should be the first event in any survey of its effects in the body. I have no new facts to contribute to this discussion, but I want to put before you a view of the present position of the pneumococcal lesions in pathology in the light of recent work with which I am familiar, and, since it is not possible to cover more than a small portion of the field, to take up certain sides of the activities of the organism which especially interest me, and to introduce them as subjects for later discussion.

The pneumococcus is usually and classically described as a Gram-positive, lanceolate, encapsulated diplococcus. It further has the following properties. Growing upon serum agar, which is an excellent medium, it forms small discrete colonies notable for their translucence; often these have a ringed appearance which is characteristic of many, but not of all, strains. Upon blood agar it produces methæmoglobin and turns the agar green; some strains produce, in addition, hæmolysis. It is an active fermenter of sugars, especially raffinose and inulin, this latter character tending to differentiate it from most streptococci, and in bile or bile salts it undergoes solution. Further, it is pathogenic for mice, in which animals it occasions a fatal septicæmia. What I have so far described is the classical conception of the pneumococcus, but in one or another property it often fails to correspond to this; other nearly related organisms frequently show some of the features considered characteristic of the pneumococcus. Elsewhere I have endeavoured to show that classification in the streptococcus group, of which the pneumococcus is a member, cannot be arrived at by the consideration of any one single property—morphology, sugar tests, hæmolytic action, &c.—but that we can only give a name to any one member of this group by considering all its properties together—particularly the following, which serve best to differentiate it from the enterococcus and streptococcus groups, taking into consideration at the same time morphology and cultural characters.

	Heat Resistance, 15′ at 60° C.	Bile and solubility.	Inulin.	Mannite.
Streptococcus	−	−	−	−
Enterococcus	+	−	−	+
Pneumococcus	−	+	+	−

Where, in organisms that otherwise conform, these four characters are distributed in the way I have shown, then the differentiation of the organisms is as certain as it can be, and where three of them are in accord, even if the fourth is anomalous, it is *probable* that an organism must still be placed within the group to which a majority of these characters assign it. Having put forward a definition of the pneumococcus, I want to touch briefly upon the following points. Firstly, its serological types; secondly, the routes of infection by which it obtains access to the body; and, thirdly, the lesions which it produces.

Serological Types of Pneumococcus.

The idea of agglutinating pneumococci is no new one, but experiments upon these lines remained unconvincing until in 1913 Dochez and Gillespie, examining 62 pneumococci in the presence of two monovalent agglutinating sera which they had prepared, found that 61 per cent. were agglutinated by either the one or the other serum, and grouped the whole series in the following manner.

[1] The opening paper read at a meeting of the Manchester Pathological Society on Dec. 12th, 1923.

I give the original figures of these workers; later and larger results have somewhat modified their proportions.

	Per cent.	
Type 1	41	(Agglutinated by Type 1 serum.)
,, 2	20	(,, ,, ,, 2 ,,)
,, 3	17	(*Pneumococcus mucosus*: distinguishable culturally.)
,, 4	22	(The residue; not serologically a fixed type.)

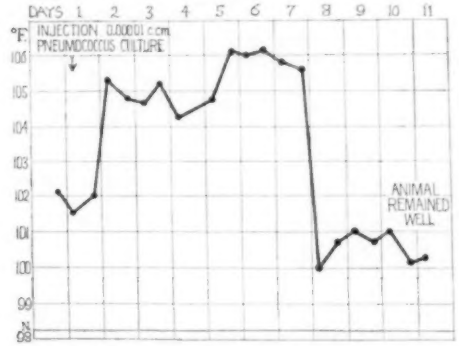
Such a serological grouping has been largely substantiated by animal experiments, the serum obtained by injecting an animal with group 1 coccus having considerable powers of protecting mice against infection with members of the first group. The same fact holds, but the efficiency of the serum is less marked, for group 2. Against group 3, which comprises organisms producing characteristic colonies and an especially dangerous type of pneumonia, an efficient serum could not be obtained, and in group 4, which is a residual class in which the majority of members are serologically independent, no single serum could be expected to prove efficacious against more than, at the very most, an extremely small number of strains.

The practical point which emerges from such a serological study is that the pneumococci fall naturally into a number of races which are serologically independent and specific, and, further, that antibodies, and consequently antisera, produced by means of members of one group are only potent therapeutically in infections by members of that group. Thus a specific serum which has a protective or curative value in group 1 infections is impotent against group 4 infections. The American work in this respect dominates the field, but although admitted in principle it is not universally agreed upon in detail. The French (Nicolle, Truche, &c.) deny the sharpness of the American divisions, insist on a much greater degree of overlapping than they allow, and hold that a similar overlapping exists in the protective power of sera when prepared from highly virulent strains, although admitting that these exert generally their maximum power against homologous organisms. The practical bearing of these investigations is upon the specific treatment of the disease, which will be dealt with fully by a later speaker.

Routes of Infection.

The lesions produced in the body by the pneumococcus are mainly those in the lungs, the meninges, and the abdomen. In the lungs the lesion is pneumonia; and in speaking of pneumonia I mean acute lobar pneumonia, a disease whose causal agent, in my limited experience, has invariably been the pneumococcus. I exclude from my contribution to this discussion broncho-pneumonia, which is a different disease and is not a specific infection. I do not propose to deal with the well-recognised pathological lesions of this condition, but only to allude to one or two of the more interesting problems which it presents. In the first place I wish to discuss the route of invasion of the lung. This has alternatively been described as by the air-passages and the blood-stream, and in reviewing the evidence we find many old facts and certain new ones. The old facts are these. In favour of blood infection we find the pneumococcus in the blood in a majority of cases of pneumonia, and I think that we can safely say that the organism is present in the blood-stream *at some time* in all cases of pneumonia. In the second place, certain cases have from time to time been cited in which pneumonia has definitely been a secondary event in the history of a pneumococcus septicæmia having origin in a lesion elsewhere. All that these facts go to prove is that the pneumococcus *can* spread into the lung when it invades the blood-stream. The real problem, however, is whether in the ordinary case the lung is invaded normally by the bronchial route, or whether the blood-stream is first invaded and the organism "electively" localised in a tissue which peculiarly favours its growth. The pneumococcus is normally an inhabitant of the mouth—an observation which goes back to Pasteur—but the type commonly found is generally the relatively avirulent Type 4; the more virulent Types 1 and 2 are rare in the normal mouth, although frequently present in cases of pneumonia. This puts the disease more than ever in the infectious category and opens up the question of whether pneumonia is not

FIG. 1.



Temperature chart of experimental pneumococcus pneumonia in a monkey (Cecil and Blake).

normally caught from another person rather than an autogenous infection, as has been widely held for many years. Given the presence in the mouth and upper air passage of an organism capable of causing pneumonia, we have to ask what is its subsequent path of advance, and by what means does it find its way into the pulmonary tissue? The matter has been considerably illuminated by some recent experimental work carried out by Cecil and Blake at the Rockefeller Institute, which has a very distinct bearing upon the problem. These observers studied at great length and in admirable form an experimentally produced pneumonia which they brought about by the intra-tracheal injection of quite small doses of virulent pneumococci. This was done by the introduction of a fine needle through the crico-thyroid membrane and

FIG. 2.

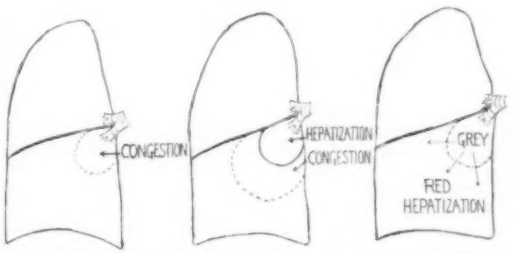


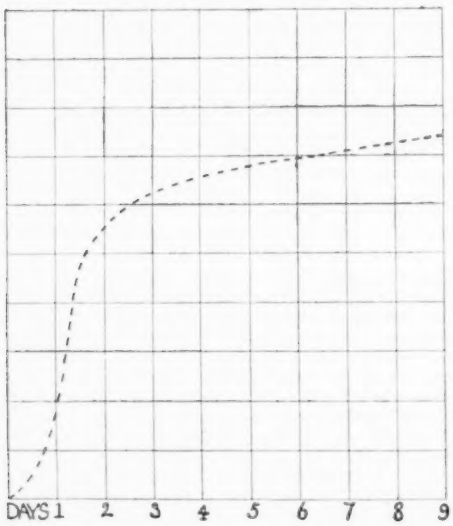
Diagram showing onset of the various stages of pneumonic consolidation and invasion of a lobe from the root zone.

the injection of the organisms in varying doses made up to a total bulk of 1·0 c.cm.—a trivial procedure in itself.

They found that with certain doses pneumonia could invariably be produced, and that this experimental disease was lobar in type and in every way comparable to the human disease, often beginning with a rigor, running a course of continued pyrexia for a number of days with a temperature chart absolutely comparable to that of the human case, associated with a polymorph leucocytosis, and either ending by crisis or causing death (Fig. 1). They also found that by putting normal monkeys into small confined cages with such artificially infected ones the disease might be caught by the former, and was associated with the presence of pneumococci of the same type as that used to infect the experimental animal. The appearances of the lungs in these animals was strikingly similar to those seen in human cases. The importance of this work lies in

the following points. It proves conclusively, if proof be still needed, that the pneumococcus will produce lobar pneumonia, and the fact that the disease could be produced at will and with certainty gave the experimenters opportunities for studying stages in the disease which are only very rarely available in human cases. With regard to the route of infection, this work confirms the aerogenic theory, since other animals injected intravenously or subcutaneously developed not pneumonia but septicæmia, which was not accompanied by lung lesions. There still remains a gap in our knowledge concerning the mechanism by which, in human cases, the organisms pass from the mouth to the

FIG. 3.



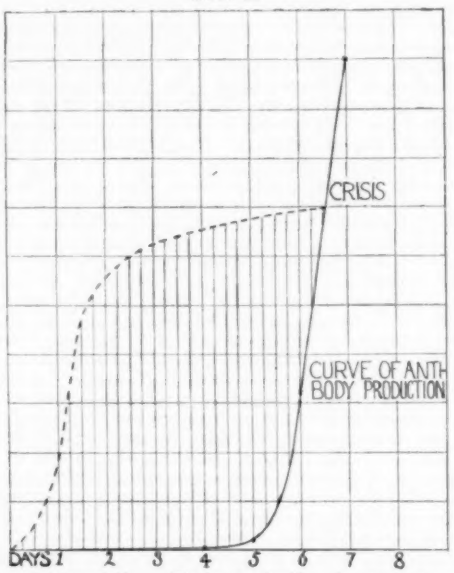
Theoretical curve of the rise and course of pneumococcal intoxication in pneumonia in a case not going to crisis by the end of the eighth day.

sublaryngeal region. Injection into the trachea caused practically invariably pneumonia, but spraying the mouth and pharynx by an emulsion of organisms was ineffective. In the work of Cecil and Blake it was also possible to study the course of invasion of the lung. The rapidity with which a whole lobe becomes consolidated has caused much speculation as to the mode of spread of the disease, and it has been asked if the infection involves in almost simultaneous fashion the whole of a lobe, or, alternatively, if to effect this rapid involvement lobar pneumonia may not have in its evolution a bronchial stage and be, in effect, a confluent broncho-pneumonia. The study of early lesions in apes shows that the disease spreads into the lung not along the air ways but eccentrically, from the root and main bronchus, and that in the early stages the organisms are not in the bronchioles and alveoli at all but are confined to the fibrous framework of the lung—perivascular and peribronchial areolar tissue, interlobular septa, and alveolar walls.

The Lesions Produced.

Thus, in its early stages the disease is *an interstitial inflammation* spreading outwards, fanwise, from the lung root. When, in common with all forms of inflammation, fluid and cells are poured out from the dilated vessels, these naturally accumulate in the alveoli, leading to red hepatisation, which follows the same line of spread from the hilum to the periphery (Fig. 2). It is only when the air sacs become filled with exudate that the pneumococcus grows out from the framework of the lung into the now consolidated air-spaces and appears in them. Grey hepatisation appears at about the fifth day; commencing in the portion of lung earliest affected, the root, it follows the same course of spread, and in experiments with apes it has sometimes been possible to find in an affected lobe a state of grey hepatisation at the hilum, of red hepatisation throughout the greater part of the lung, and of incomplete consolidation at the margins. We sometimes see the latter condition in consolidated lungs post mortem, but from a perusal of the findings I have been describing it seems that the disease spreads less rapidly through the lung in monkeys than it does in the human subject. The sharply lobar distribution is explicable, as it always has been for those who accepted the aerogenous theory, on anatomical considerations. The relatively avascular pleura opposes a pretty effective barrier to

FIG. 4.



Curve of hæmolytic antibody production imposed upon the theoretical curve of pneumonic intoxication. The shaded area represents the degree and duration of the latter, and its rapid obliteration by the sudden formation of antibodies.

the direct and contiguous spread of inflammation, much as the dura often does under other circumstances. It is only after effective soldering of two lobes by plastic exudate, and inflammatory vascularisation of the opposing pleural layers, that one can conceive of a spread from lobe to lobe at a distance from the hilum. When this occurs, the infection may creep across the barrier and invade a contiguous portion of lung by continuity of tissue; here, of course, there is no outward spread from the hilum, such as I accept now as the ordinary mode of invasion of the primarily affected lobe.

Cause of Crisis.

One other interesting speculation upon which I should like to touch is the cause of the crisis. This has been variously attributed to a sudden development on antibodies; to an anaphylactic reaction (Truche); to a development of hydrogen-ion concentration in the diseased tissue incompatible with the life of the pneumococcus; and, by McLeod, to the production by the organisms of hydrogen peroxide, which ultimately reaches a concentration sufficient to destroy them. I cannot go over the arguments for or against these various views; my personal view inclines towards the antibody development theory. This, I am conscious, is a view at which gibes can readily be cast on account of the vagueness of our knowledge of antibodies, and I know it carries us perilously near to the conceptions of the older school of humoral pathologists. There are two outstanding facts which demand consideration; the first, which dominates the picture of crisis, is its time of occurrence, which is so regularly in the vicinity of the seventh day—the sixth to the eighth. The second fact is that the serum of

patients who have recovered from the disease can exert a definitely protective action towards mice, although no antibodies may be demonstrable by experiments in vitro. We are therefore, I think, entitled to assume the presence of some unrecognised antibody. Let us look at the condition of the patient. Pneumonia is a disease which develops rapidly, and once it is fully developed runs an approximately steady course over a number of days. I therefore suggest that the patient during this period is receiving a steady dosage of the poisons produced by the infecting organism, and that the cure of these, after a rapid rise, is maintained at a fairly steady level (Fig. 3); in the meantime the antibody production is slowly called into being by this fact. If we examine the course of development of easily observed antibodies in an experimental animal—e.g., the hæmolytic antibody—we find that after injection (or infection) the rise comes on gradually after a latent period, is slow in the beginning, and then gathers way with great rapidity. In a case where the response is good its curve is ascending in an almost vertical line somewhere about the sixth or seventh day. There is no reason to believe that the mechanism of production of antibody to the pneumonic organisms and its toxins should be a different one, and it therefore seems likely that the steady intoxication of a pneumonia is abruptly terminated by the steep and sometimes dramatic rise of antibodies which may be expected just at the time at which crisis takes place, and that where the curve of antibody rise cuts the curve of toxin concentration, there crisis occurs (Fig 4).

I have only touched upon the fringes of this fascinating subject, and even then upon only one of the types of infection which it includes. It has not been possible to deal with the infections of the peritoneum and meninges, both of which will, I hope, be dealt with in the course of the discussion.

THE TREATMENT OF ACUTE PNEUMOCOCCUS INFECTIONS OF THE RESPIRATORY TRACT.[1]

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I PROPOSE to limit my remarks within the very narrow compass of the acute respiratory infections due to the pneumococcus. And since this leaves a vast bulk of literature and work to be dealt with, I would further limit my observations to the treatment of acute respiratory infections by the pneumococcus.

Recognition of the Rôle of the Pneumococcus.

As long ago as 1874 it was pointed out by von Jurgensen that pneumonia was, in its course and character, an acute infection. Bacteria were first demonstrated in the sputum by Klebs, but Freidländer first described an organism which was regarded as the causative agent. This opinion was severely criticised by Baumgarten, and was quickly replaced when much more careful and generally accepted work was published almost simultaneously by Fraenkel and Weichselbaum. In 1880 and after Fraenkel's organism was found in other lesions than pneumonia. In the same year the pneumococcus was found in healthy saliva by Aufrecht, by Pasteur, and by Sternberg. These organisms were proved to be fatal to rabbits, but no pneumonic consolidation of lung was found in the animals. These findings, in conjunction with other facts, led to the belief that infection took place by direct inhalation of a normally existent organism of the upper respiratory tract, resistance being for some reason temporarily lowered. In 1884 Weichselbaum demonstrated the organism in the peripheral blood of patients with pneumonia, and prior to 1900 Silvestrini and Sertoli had recovered the pneumococcus from the blood-stream in 15 out of 16 cases, at the same time showing that this did not affect the prognosis.

[1] The second paper read at the meeting of the Manchester Pathological Society on Dec. 12th, 1923.

The recognition of the pneumococcus as the causative agent in pneumonia led directly to its recognition as the causative agent also in some of the complications of the disease—empyema, endocarditis, pericarditis, and arthritis. But in spite of this and of the concurrent development in the course of the disease, of nephritis, jaundice, and parotitis, the appreciation of pneumonia as a blood infection appears from the literature only slowly to have gained acceptance. It was taught that pneumonia was a focal disease with a general toxæmia, and it is still uncertain how widely acceptable is the view that pneumonia should be regarded as a blood infection with a focal involvement, precisely on all fours with typhoid. The point of view would appear to be important in the consideration of treatment.

Present Position of Treatment.

The early attempts to treat the disease along the lines of anti-sera were frustrated by the difficulties experienced by workers in their studies of the causative organism. Little if any reaction could be obtained by animal inoculation, except against the individual inoculum, and it was concluded that too many types of pneumococcus existed to make serum treatment a possibility. In 1913 Dochez and Gillespie published their study of pneumococcal classification by means of immune sera. By this means the organisms were divided into four groups, but not until the publications of the Rockefeller workers in 1917 did the classification bear any direct relation to the treatment of the disease.

The present position of this work is, I take it, somewhat as follows: The division of the pneumococcus into four groups is now generally accepted, except in France, where only three are recognised. Type 1 is accepted by all workers as a fixed type which produces a specific anti-serum, although this can only be accepted with certain reservations in view of Andrewes's recent work. Type 1 anti-pneumococcic serum is regarded by the Rockefeller workers as a specific against Type 1 pneumonia. This is accepted fairly generally in America, but with a good deal of reserve elsewhere. Glynn, in his 1923 report to the Medical Research Council, states[1] that almost no evidence of the value of this treatment is available from English observers.

To determine, therefore, the desirability of trying this line of treatment in England, it would seem proper at the outset to consider some of the factors which must enter into a weighed judgment: (1) Incidence and mortality of pneumonia in England as compared with America; (2) incidence and mortality of Type 1 pneumonia in England as compared with America; (3) American statistics by workers other than those at the Rockefeller Institute of the success or otherwise attending this line of treatment; (4) experimental determination of the potency of the serum; (5) availability, dosage, and method of administration of the serum, with any dangers which may accompany its use; (6) any other line of treatment giving results as satisfactory and resting upon any sort of basis other than an empiric one.

At the outset it may be well to remember two fallacies which are extremely liable to affect such inquiries: First, the estimation of the value of a remedy is one of the most difficult of all problems. William Withering, in introducing digitalis to medicine in 1785, wrote: "It is much easier to write upon a disease than upon a remedy. The former is in the hands of nature, and a faithful observer, with an eye of tolerable judgment, cannot fail to delineate a likeness; the latter will ever be subject to the whims, the inaccuracies, and the blindness of mankind." Secondly, although we may agree with Sancho Panza that there is little to be gained by looking for this year's birds in last year's nests, yet it is equally true that we are very liable to believe the birds to be flown when in reality the eggs are addled.

Mortality.

The mortality for most acute infective diseases has gradually diminished under the improved hygiene of

the past few decades. The table shows these facts for England and Wales. In 1919 the total deaths from pneumonia, as given in the Registrar-General's report, was 38,984, yielding a death-rate of 105·8 per 100,000 (Table I.). In America the corresponding death-rate was 149·8 per 100,000. It would not appear that any further figures are required to demonstrate the very present importance of the question of the treatment of pneumonia. The title of Captain of the Men of Death, given to tuberculosis by John Bunyan, was transferred from that disease to pneumonia by William Osler. Cole states that in England, France, and America probably one-tenth of all deaths are due to acute respiratory diseases. Often enough this is merely a terminal event, but apart from these, many are wiped out at the maximum of their economic efficiency. Shattuck and Lawrence, analysing 2882 cases from the Massachusetts General Hospital, concluded that there was a 10 per cent. increase of case mortality for every decade after the age of 20.

Type Incidence.

Polyvalent and other sera have from time to time been introduced for the treatment of pneumonia, but it appears that they have failed to satisfy bacteriological tests with the exception of that prepared by Trouche. The Rockefeller workers only offer a serum against type 1 pneumococcus. It therefore becomes important to find the percentage incidence and mortality of type 1 pneumonia so far as figures are at present available.

TABLE I.—*Crude Mortality Rate per Million Living.*

Year.	Typhoid.	Phthisis.	Pneumonia, excluding influenza.
1861–70	—	2590	990
1871–80	321	2231	937
1881–90	199	1810	1034
1891–1900	175	1418	1214
1901–1910	91	1143	1254
			Death-rate from pneumonia per 100,000.
1919 England and Wales ..			105·8
1919 America			149·8

Tables II. and III. show the incidence and mortality of the various types of pneumonia in America and part of Europe. For the bulk of my figures I would acknowledge my indebtedness to the very interesting report to the Medical Research Council by Prof. E. E. Glynn, of Liverpool, and his co-workers, as also for the excellent bibliography. It is at once noticeable how largely the American figures bulk in all these records, but a great deal of similar work has been done by Lister and others among the Rand miners, of whom pneumonia has been and still is so great a scourge. From the tables shown it would appear that one-third of the English and American cases are due to type 1 pneumococcus, and taking the 1919 figures for England, Glynn estimated that in that year 32,000 people contracted type 1 pneumonia, and 8000 died from it. So that there would appear to be quite sufficient annual material to justify the use of the serum here as in America.

TABLE II.—*Lobar Pneumonia.*

—	Type 1.		Type 2.		Type 3.		Group 4.	
	Inc.	Mort.	Inc.	Mort.	Inc.	Mort.	Inc.	Mort.
America 1632 cases	32·5	21·2	26·0	34·7	11·6	54·1	29·4	19·1
France 61 cases	19·0	—	88·0	—	27·0	—	2·5	—
Gt. Britain 361 cases	38·0	27·1	32·0	36·3	3·9	25·0	27·1	11·5

Inc. = Incidence. Mort. = Mortality.

TABLE III.—*Broncho-pneumonia.*

—	Type 1.		Type 2.		Type 3.		Group 4.	
	Inc.	Mort.	Inc.	Mort.	Inc.	Mort.	Inc.	Mort.
America 797 cases	1·1	—	8·9	—	10·9	—	79·1	—
France 26 cases	64·0	—	57·0	—	64·0	—	0·0	—
Gt. Britain 85 cases	9·4	0·0	17·7	—	4·7	50·0	68·2	29·1

Efficiency of the Serum: Experimental.

As the guinea-pig is the final court of appeal in tuberculosis, so is the white mouse in pneumococcal infections. The reaction in the latter is to some extent both qualitative and quantitative, and the minimal lethal dose of a culture can be determined with moderate ease. If antipneumococcal serum can reasonably be expected to produce any curative effect, it should antagonise a high multiplication of the minimal lethal dose. The Rockefeller workers found that they could produce antisera to types 1, 2, and 3, but they failed to do so for group 4, except for individual members of that group. Further work led them to the conclusion that their antisera for types 2 and 3 were unsatisfactory, but they found that a serum could be produced, 0·2 c.cm. of which would protect a 20 g. white mouse against 10,000 M.L.D. of type 1 pneumococcus. Other observers appear to have obtained much the same results. In 1920 Cecil and Blake published a most interesting series of articles, in which they showed that constant results could be obtained by intratracheal injections of virulent pneumococci in monkeys, and that the disease so produced ran a course exactly comparable with pneumonia in the human subject.

Experiments were then made with type 1 pneumococcus, pneumonia being produced with an amount of inoculum well above the M.L.D. for the monkeys used. Antipneumococcic serum type 1 obtained from the New York State Board of Health was given on various days of the disease. Four examples are extracted on Table IV. to show the type of result obtained. These would appear to be as striking as any serological treatment could well be, but in reading their protocols one is constantly struck also by the certainty and rapidity with which the organisms disappear from the blood-stream. There is no record of any untoward results from the quantity of serum administered. The average weight of the animals was one-sixteenth the weight of the average human being, and it is supposed, therefore, that to obtain the same results clinically sixteen times the doses here shown would be required.

Efficiency of the Serum: Clinical.

In the estimation of the efficiency of any serum treatment many factors must be considered, and the numbers available for judgment are insufficient to come to any real conclusion. Table V. gives some indication of the results; more than half the cases are recorded by the Rockefeller workers, and all the sera, so far as I have been able to find, came from that source. We do not know whether the average age of the untreated cases would be identical with that of those treated, neither do we know the day of disease upon which the serum was given. Although the sex incidence of pneumonia is as 3 to 1 in favour of males, yet the mortality is considerably higher in females. All these and a host of other factors will occur to each one of us, making the smallness of the data a very considerable bar to their ready acceptance. More particularly is this the case when we remember that the mortality from pneumonia in the pre-war German Army showed much smaller figures than those now given by the Rockefeller workers.

Clinical findings have been published showing the rapid disappearance of the pneumococcus from the blood-stream as the result of suitable serum treatment; findings exactly comparable with those of Cecil and Blake, but the value of negative findings in blood-culture work would appear to be very problematical.

TABLE IV.—*Results Obtained after the Use of Antipneumococcic Serum Type 1.*

Day of disease.	Monkey 93. Dose 0·001 c.cm.				Monkey 94. Dose 0·1 c.cm.				Monkey 45. Dose 0·001 c.cm.				Monkey 113. Dose 0·01 c.cm.			
	Tr.	Pn.	WBC.	Serum.	Tr.	Pn.	WBC.	Serum.	Tr.	Pn.	WBC.	Serum.	Tr.	Pn.	WBC.	Serum.
1	101	1	16	—	100·6	13	24	—	101·2	3	15	—	106	1	32	—
2	103·5	337	36	—	104	103	74	25	Rigor. 103·6	37	65	40	105	88	35	—
3	103·5	500	16	—	103	—	45	20	102·6	—	28	40	105	400	24	—
4	104·4	365	14	—	101	—	13	—	102	—	16	—	104·6	69	14	—
5	104	246	11	—	103	—	19	20	101	—	17	—	104·5	17	15	30
6	104·5	24	10	—	Crisis.		21	—		Recovered.			104·5	—	12	30
7	104·6	35	12	—	Recovered.								103	—	22	30
8	103	73	14	—									103	—	23	20
9	101	66	12	—									Recovered.			
10	104	12	11	—												
11	103	3	16	—												
12	102	746	18	—												
13	—	750	Died.													

Key.—Dose = Quantity of virulent broth culture injected intra-tracheally. Tr. = Temperature Fahr. Pn. = Pneumococci per 0·5 c.cm. blood. WBC. = Leucocytes expressed in thousands. (Abstracted from Blake and Cecil.)

TABLE V.—*Serum Treatment.*

	Cases.	Deaths.
Neufeld and Handel	3	0
Bloomfield	11	3
Cole and MacCallum	12	0
Park and Chickering	31	2
Hart	31	7
Cole	195	18
French	15	6
Glynn	6	2
	304	38

Later—

Cole reports	495 cases	Death-rate,	10·5 per cent.
Thomas	255 ,,	,,	12·9 ,,
Total	859 ,,	Mortality	12·0 ,,
In absence of serum treatment mortality probably not less than			25·0 ,,

TABLE VI.—*115 Serum-treated Cases.*

Serum given within—	Cases.	Deaths.	Mortality.
			Per cent.
First 3 days	12	0	0·0
,, 4 ,,	38	7	18·4
,, 5 ,,	68	8	11·8
,, 6 ,,	89	10	11·2
After 6 ,,	56	15	26·8

TABLE VII.—*71 Controls Untreated by Serum.*

Admitted within first 3 days	13	4	30·8
,, ,, ,, 4 ,,	32	4	12·5
,, ,, ,, 5 ,,	16	4	8·4
,, ,, ,, 6 ,,	58	7	12·4
Admitted after 6 days	13	5	38·4

Tables VI. and VII., copied from Locke's critical review of this work appears to carry with it some conviction in spite of the very small numbers, especially as it was produced under controlled conditions; for every case treated by serum one was also treated without serum.

Availability.—In looking through the present literature it appears that almost all the published results of serum treatment have been attained from that issued by the Rockefeller Institute. Type 1 anti-pneumococcic serum is now, however, a British product, can be readily purchased, and is standardised to the Rockefeller standard, but I know of no clinical records of its use. At the same time there would seem to be no reason why it should be any different from the older serum.

Dosage.—Speaking broadly, it may be said (1) that the serum should be given intravenously and slowly by a gravity method; (2) that the first dose should be 100 c.cm.; (3) that this dose should be repeated every eight hours until a favourable result is attained; (4) the average dose required is 250 c.cm., but in severe cases four times that amount may be necessary. Cecil and Blake undertook their work largely because they considered that physicians were unduly sceptical of the value of the serum and that when used, frequently it was given too late in the disease and in too small doses. It is probably as unfair to judge of serum treatment when given late in the disease as it would be to judge similarly of antidiphtheritic serum.

Dangers.

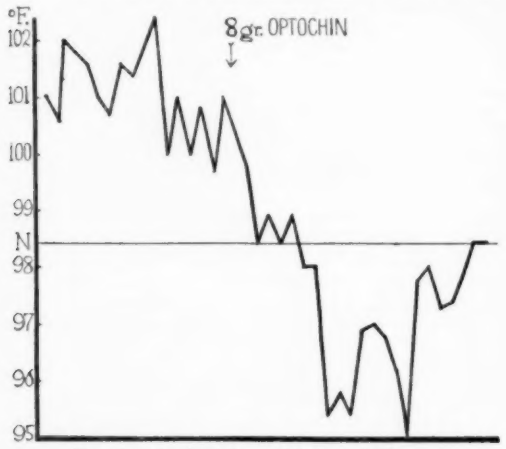
In looking through the recorded cases there appears to be a very real danger of serum reactions of two varieties: (1) An immediate reaction in the nature of anaphylactic shock, which can to some extent be countered by ten minims of one in a thousand adrenalin solution, or avoided by slow and gradual desensitisation; (2) a later reaction occurring around the eighth day and showing urticaria, arthritis, and pyrexia. It appears that in some cases this temperature reaction may last a long time, and may be difficult to differentiate from a continuance or a complication of the original infection. In this connexion it should be remembered that there is reason to expect serum sickness in the very type of patient for whom this treatment would seem most urgently needed. The man in the prime of life to-day has almost certainly been in the army, and is therefore quite likely to have had one or more injections of prophylactic antitetanic serum during his war service. The proportion of such in the adult male population to-day must be considerable, and they therefore constitute a very real danger. So that, prior to administration, it would seem wise to inquire carefully as to previous dosage with any horse-derived serum and also to inquire for a history of asthma.

Other Treatments.

In 1911 Morgenroth and Levy introduced the drug ethylhydrocuprein, a derivative from the quinine group, under the name of optochin, and claimed for it a sterilising power against the pneumococcus of a very high order. In 1912 Wright investigated these claims, and concluded that they were well founded. A series of clinical studies were made by Moore and published in 1920. A good deal of work has been done on this quinine derivative which goes to show the following points: (1) That its activity is much greater against the pneumococcus than against any other organism (so far is this the case that Moore suggests its use as a test for the pathogenic pneumococci); (2) that it will inhibit the growth of the pneumococcus in vitro in dilutions as high as one in a million; (3) that in experimental mice or rabbits it is capable of protecting against a hundred minimal lethal doses of virulent pneumococci; (4) that its action is best seen when given under conditions of slow absorption, and is too evanescent to produce good effects when given intravenously; (5) that when given in conjunction with a homologous antiserum it is capable of multiplying the effect of that serum by 50; (6) that it acts equally efficiently against all types of pneumococci, including *Pneumococcus mucosus* 3; (7) at the same time it possesses a very definite toxicity, and it is possible to kill the animal in attempting to cure the disease.

Moore and Chesney published in 1923 a report on the use of this drug in pneumonia. They state

that in 75 cases no definite therapeutic effect could be shown, but that 12 per cent. of their cases showed amblyopia, three mild in degree and six severe. All those who survived the pneumonia recovered their sight. They attribute failure to the toxicity of the drug, which shows toxic effects before a pneumococcidal concentration has arisen in the blood. It is stated that no ocular signs have been seen so long as the dose given does not exceed 24 gr. The temperature chart here given shows the result of one dose of



Four-hourly chart from fifth day of disease.

8 gr. given to a recent case which was not doing well; whether the marked subnormal temperature was post, cum, or propter is very doubtful, but the crisis was certainly accompanied by much more shock than usual. No data have been found for treatment with serum and optochin.

Returning again to the treatment of pneumococcal infections by homologous antisera, the question of determining the type of organism concerned must be considered from the point of view of the ease or difficulty with which this may be done. Antisera may now be freely purchased for this grouping; they can, however, scarcely be called "high-titre sera," for their titre is very low, and this materially diminishes their use, and one can only hope in the future that much higher titres may in some way be obtained.

There are two methods of grouping which may almost fairly be called clinical, in that they may be applied at the bedside in a short space of time.

(1) The urine is said to contain a body which by interaction with the specific serum yields a precipitate only for the group to which the infection belongs. The clear filtered or centrifuged urine is added to the undiluted high-titre serum, a precipitate indicating a positive result.

(2) Since bile solubility is one of the bacteriological tests for the pneumococcus, it follows that the organism may be extracted from sputum by that means. One per cent. taurocholate solution may be added to pneumonic sputum in equal volume, and the whole thoroughly shaken for some minutes. The mass is now filtered through ordinary filter-paper, and a precipitin reaction may be carried out in a piece of narrow-bore glass tubing with a teat on the end. In this way a rough grouping may be rapidly done against the undiluted type sera, although the lowness of the present British sera must delay the result. Glynn in his work found a similar procedure most useful and trustworthy, but he was using the Rockefeller sera.

To the ordinary bacteriological processes in connexion with the pneumococcus, Dr. Dible has already referred, but it is manifest that if the pathologist is to coöperate adequately with the clinician in this matter of grouping, the time occupied in investigation must be reduced to a minimum. It is in this respect that the white mouse method is so valuable, particularly if the peritoneal exudate be used for direct agglutination, as the time occupied would be measured in hours only.

Blood-culture has been found to give about 50 per cent. of positive results, and Rosenow considered that the fourth, fifth, and sixth days were the most likely; but lung puncture, used largely by French in France during the influenza pandemic, would appear to be quite safe, to involve the patient in but little suffering, and to give a very high percentage of positive results. This would appear for many reasons to be the method of choice, to which view Lister in South Africa also testifies. By either of these methods a pure culture is likely to be obtained, which is easy to agglutinate later.

I take it as an axiom nowadays that no remarks on the treatment of an acute infection can be regarded as complete without some consideration of the carrier problem. It is stated that 80 per cent. of all lobar pneumonias are due to one of the three fixed types of pneumococcus. On the other hand, 90 per cent. of pneumococci recovered from the bucco-respiratory tract of healthy individuals belong to group 4. Similar investigation of pneumonia contacts shows a very high percentage of pneumococci belonging to the type with which contact has occurred, as was shown by the examination of nurses, orderlies, residents, and physicians who were working amongst the disease. The carrier state of recovered pneumonia cases has been shown to persist for periods varying from 28 to 90 days, and it is well recognised that the virulence of the pneumococcus can be materially raised by animal passage.

Conclusions.

It has been my endeavour to lay before you some data upon which the following theses may perhaps be supported: (1) Pneumonia is an acute general infection; (2) its annual death-roll in our own country is sufficiently high to merit not only careful attention but furious thinking; (3) a greater statistical knowledge is more than desirable; (4) bacteriological investigation is not only the road to increased knowledge but also the key to treatment; (5) there is sufficient evidence to justify the statement that serum treatment should be instituted in suitably typed cases as early as possible in the disease, should be given in suitably large doses, should be repeated every eight hours, and should be persisted in; (6) optochin in non-toxic doses merits a further trial on the grounds of experimental data; (7) without the aid of one or both of these methods we are left with a merely expectant routine, creditable enough in the days of Hippocrates, but scarcely justified in the light of such masses of evidence as modern research has placed at our disposal.

DIABETIC COMA WITH ANURIA.

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A CASE of diabetes mellitus in coma, associated with complete anuria, provided the opportunity of observing the action of insulin upon the intermediary metabolism in diabetes under conditions where the excretory function of the kidney was in total abeyance, and therefore playing no part, in so far as that function is concerned, in the regulation of the chemical composition of the blood. (Experimentally, the condition might be simulated in a partially depancreatised animal by ligating the renal arteries and inducing coma by an appropriate diet.)

The observations made in this case, although by no means complete, are of considerable interest, for not only do they reveal what marked changes in the blood may be effected, independent of renal excretion when insulin is administered in diabetes, but also they show that the toxæmia associated with total suppression of urine does not inhibit the action of

insulin as do certain toxæmias, especially those of pyogenic origin.

Clinical History.

J. C., aged 60 years, a metal-smith, was admitted to the Sheffield Royal Hospital, under Prof. Arthur Hall, on May 30th, 1923, in a comatose condition, and the following history was obtained from his wife:—

The subject of diabetes for six years, he had been successfully treated by dieting during the last two, attending hospital as an out-patient. He was an intelligent man, and had been in the habit of testing his own urine from time to time, and on the appearance of sugar had abstained from all food until sugar-free. His diet during these two years had consisted of vegetables, eggs, bacon, and gluten bread. Ever since his illness began he had been troubled with constipation, but about Christmas, 1922, this became more pronounced, and he began definitely to fail, suffering from polyuria, which necessitated his rising frequently in the night, and great thirst. He also began to lose weight.

He was admitted to the wards at 1 P.M., and his condition was as follows: Dyspnœic but not hypernœic, pulse regular. Very thin and emaciated, lying with limbs still and rigid in a flexed position. They can be extended with difficulty. He is very drowsy, cannot answer questions, and seems unconscious of his surroundings, though he moves away from the prick of a pin. Eyes react normally to light, though both pupils are rather small. There is no paralysis of the ocular muscles, nor any retinal changes, his discs appearing quite normal. The tongue is dry and coated, and the breath smells strongly of acetone. There is nothing abnormal on abdominal examination. No paralysis of limbs and the superficial and deep reflexes appear to be normal. A few râles are audible at both lung bases and there is a faint systolic murmur heard over the præcordium.

It was clear that he was in a state of coma, and immediately he was ordered the usual routine treatment of soap enema, followed by saline enema, and hot water by mouth. At 6 P.M., as he had passed no urine, a rectal examination was made, which disclosed a moderately enlarged prostate, in consequence of which a catheter was passed but no urine was obtained. The blood pressure estimation gave the following figures: Systolic B.P., 105; diastolic B.P., 70. The blood examination showed: Blood-sugar, 0·957 per cent.; plasma bicarbonate, 15·7 vols. per cent.; ketone bodies, as acetone, 59·13 mg. per 100 c.cm., plasma; non-protein nitrogen, 110 mg. per 100 c.cm.

Treatment.—The treatment he received is summarised as follows:—May 30th: On admission, 1 P.M., enema, and hot water by mouth; at 6 P.M. and 9 P.M., insulin 20 units; at midnight, insulin, 20 units, glucose, 10 g., per rectum; May 31st: 4 A.M., insulin 20 units. By this time he was quite rational, though still anuric. 10 A.M.: Pilocarpine 1/3 gr. produced profuse sweating; during the forenoon hiccough and vomiting began. 12 noon: Digitalis 1/100 gr., strychnine 1/60 gr.; 2 P.M., pituitrin 1 c.cm.; 4 P.M., insulin 20 units. In spite of hot packs, &c., he remained anuric and his condition steadily grew worse until death, which occurred on June 2nd, at 5 A.M.

Autopsy Report.

At the post-mortem examination many old adhesions were found on both pleuræ, with some basal œdema of both lungs. The kidneys were small and œdematous, and showed signs of chronic interstitial nephritis, the capsule being adherent. The bladder was small and contracted, and contained about a drachm of urine. The head of the pancreas appeared hard and fibrotic. There was generalised marked arterio-sclerosis throughout the body.

Microscopic Examination.—Liver: A slight early passive congestion is present and the liver cells contain a minute amount of bile pigment. No cirrhosis present and bile-ducts healthy. Kidney: Shows the typical "granular" appearance, with alternating markedly and slightly sclerosed areas. Hyaline casts are present in some of the tubules, but the tubules show no acute nephritic changes, though post mortem autolysis is present in moderate amount. Atheromatous changes, though present in some of the vessels, are by no means marked, whilst a trace of passive congestion is seen. Spleen: Shows some increase of the fibroblastic elements of the stroma. A few small recent hæmorrhages are seen in the section, as also small groups of cells containing pigment which appears to be hæmatoidin. The Malpighian corpuscles are normal. Pancreas: Sections from various areas of the pancreas have been examined. Some slight chronic fibrotic changes are seen about the ducts, whilst the alveolar portion of the gland is normal, save that the islets of Langerhans are practically unrepresented in the sections.

The blood-sugar was determined by the method of Folin and Wu.[1] At 5.30 P.M. on the day of admission it was 0·957 per cent. This is the highest value ever obtained in this hospital (higher values have been reported by Joslin,[2] who records a case with blood-sugar of 1·37 per cent. 12 hours before death). By midnight it had fallen to 0·56 per cent., and at 9 A.M. next day it reached 0·247 per cent. Thus in 15½ hours, during which time 80 units of insulin had been injected, the glucose was reduced to 25·8 per cent. of its former concentration. Assuming the blood volume in this patient to be 5 litres, and that it remained the same, there were about 35 g. less glucose in the circulating blood than before the exhibition of insulin. Of course, the actual amount of glucose utilised was considerably greater than this, for other body fluids would be in equilibrium with the blood as regards their glucose content. Since none was excreted by the kidneys, the glucose must have been oxidised, polymerised into glycogen, or converted into fat.

The Plasma Bicarbonate.—When the concentration of sugar in the blood was highest the plasma bicarbonate was 15·7 vols. per cent. This showed a very marked reduction (the normal average value being 60 vols. per cent.), and indicated a severe acidosis. The next day it had risen to 39 vols. per cent. The acetone bodies in the blood were determined by the method of Van Slyke and Fitz.[3] When the plasma bicarbonate was 15·7 vols. per cent. the total acetone bodies, expressed as acetone, were 59·13 mg. per 100 c.cm. of blood plasma. The next morning the value fell to 26·42 mg., and at 5 P.M. the same day reached a value of 6 mg. per 100 c.cm. of plasma. While the patient was in coma it was impossible to obtain a sample of alveolar air, but a sample obtained at 1 P.M. on the day following the beginning of insulin treatment had a carbon dioxide tension of 34·7 mm. Hg.

Remarks.

The changes thus observed are those which accompany the successful treatment of diabetic coma with insulin. The remarkable feature in this instance is that they occurred quite independently of renal excretion, for though the kidney was playing no part in the removal of glucose and acetone bodies from the blood, or in the regulation of the acid-base equilibrium by the excretion of an acid urine, an adjustment toward the normal was nevertheless brought about to such a degree that the patient emerged from the coma. It would seem that this must have been due to the oxidation processes in the tissues. With the utilisation of glucose there would be oxidation of the ketone bodies, with a liberation of bases and a corresponding diminution in the acidosis.

Such an assumption receives support by the following considerations. The ketone bodies in the blood, expressed as acetone, were 59·13 mg. per 100 c.cm. just before the insulin treatment was begun. By the next afternoon they had decreased to 6 mg. per 100 c.cm. Therefore, from every 100 c.cm. of blood 53 mg. of ketone expressed as acetone had been removed. Assuming that the ketone bodies were present in the form of β-hydroxybutyric acid, then from each 100 c.cm. of blood 96·89 mg. of this acid which would require 21·42 mg. of the base sodium to neutralise it were removed. With the oxidation of this acid the base would be liberated and accordingly increase the plasma bicarbonate, for the carbon dioxide tension of the blood is such that all the base available after the more highly dissociated acids are neutralised is converted into the bicarbonate. 21·42 mg. of sodium are capable of combining with 41 mg. or 25·7 c.cm. of carbon dioxide as the bicarbonate. Were this the only reaction taking place in so far as the oxidation of the β-hydroxybutyric acid is concerned, the plasma bicarbonate should increase 20·87 vols. per cent. As a matter of fact, it did increase from 15·7 to 39—that is, 23·3 vols. per cent. The non-protein nitrogenous constituents of the blood were increased. Twenty-four hours after the onset of the anuria 110 mg. per 100 c.cm. were present in the blood. Their value rose to 117 mg. on the following day and fell to 107 mg. before death. These values are similar to those observed in uncomplicated cases of suppression. In this case, with the chronic changes observed in the kidney at autopsy, it is quite possible, in fact likely, that the high non-protein nitrogenous content existed some time before the onset of the diabetic coma or the anuria.

[1] Van Slyke, D. D., and Wu, H.: Jour. Biol. Chem., xli., 367.

[2] Joslin, Elliott P.: The Treatment of Diabetes Mellitus, 1917, p. 89.

[3] Van Slyke, D. D., and Fitz, Reginald: Jour. Biol. Chem., xxxii., 495.

The plasma chlorides were determined by Whitehorn's[1] method and showed only a very slight diminution. The values obtained were as follows: May 30th, 1923: 4 P.M., 0·465 per cent.; 6.15 P.M., 0·458 per cent.; 31st: 10 P.M., 0·439 per cent.; June 1st: 10 A.M., 0·420 per cent.; 4.30 P.M., 0·406 per cent. During the two days the value decreased about 13·7 per cent. of the original concentration. This may have been the result of blood dilution, but no haemoglobin estimations were made at the time to determine if such dilution were taking place.

Our thanks are due to Prof. Arthur Hall for permission to observe and record this case.

THE INTERNAL SECRETION OF THE TESTIS.

By KENNETH M. WALKER, F.R.C.S. ENG.,

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ALTHOUGH the effects of castration have long been known to the world, only within the last half-century has it been realised that these effects are due to the body having been deprived of an internal secretion that is vital to the development of the secondary sexual characters. The actual date at which it may be said that the doctrine of the internal secretion of the testis was born was 1889, when Brown-Séquard described before a meeting of the Société de Biologie the results of his experiments upon himself with subcutaneous injections of fresh orchitic extract. This lecture not only established the fact that the testis had an internal secretion, but also laid the foundations of the whole conception of internal secretion, a conception which may have been hinted at by Berthold but had never before been clearly enunciated. To physiology this advance opened up a fruitful field for investigation, and to medicine it supplied an entirely new therapeutic weapon. Although the centre of interest afterwards shifted from the testis to the other endocrine glands, mainly on account of the greater possibilities that they offered in the way of organotherapy, the fact that it was Brown-Séquard's researches that made possible the subsequent triumph of thyroid therapy lends to the subject of the internal secretion of the testis a special interest.

But quite apart from its importance in the history of organotherapy there is attached to this subject an interest of more recent date due to the work of certain modern researchers, who have claimed that by employing means to increase the internal secretion of the testis it is possible not only to make good the defects of eunuchoidism but also to attack the symptoms of old age itself. I refer particularly to the work of Steinach and Voronoff. It may, therefore, not be out of place to review in the light of modern knowledge the whole subject of the internal secretion of the testis and to examine what means are available for augmenting the internal secretion of the testis, and what bearing these methods may have on the problem of old age. But before dealing with these problems it will be necessary to consider briefly certain questions connected with the origin, mode of action, and nature of the internal secretion of the testis. In seeking answers to the questions discussed in this preliminary article, it will be profitable to draw upon stores of knowledge amassed by workers in other branches of science, notably in the realms of biology and comparative anatomy. Biological problems will, however, only be dealt with in so far as they have a direct bearing on the subject under consideration.

The Results of the Removal of the Gonads.

The removal of the testes or ovaries has a profound influence not only on the development of the sexual apparatus, but also on the growth of the individual, on his metabolism, and even on his psychology. Most marked, however, is its effect on the development of the characteristics of sex and more particularly of those secondary characters which, although not essential to reproduction, are contributory to that act. Amongst these secondary characters of sex are the female breasts, the accessory sex glands, such as the prostate and vesicles, and the male weapons of offence and defence—e.g., the antlers of the stag, the spurs of the cockerel, &c.

It is important to remember that the severity of the effects of castration will depend on the age at which the operation is effected. Although definite changes occur, particularly in metabolism, and in the accessory sex glands, as the result of the removal of the testes from a mature individual, the outward effects of the operation are far less striking than when it has been performed in early life before the development of the secondary sex characters. In the latter case not only do such organs of sex as the prostate and vesicles fail to develop, but the whole growth and mentality of the individual is influenced so that he becomes easily recognisable from the normal male. But even if the removal of the testes be effected early in life the suppression of the secondary characters of sex is never complete. In the eunuch there appears a beard, although a sparse one, and that essentially male characteristic the margo supraciliaris is never suppressed. Moreover, if the testes and ovaries be removed from a young male and female of the same species, the adult that results is not identical in the two cases, even apart from the distinctive primary organs of sex. Differences will always be found in the general build of the two sexes, however early removal of the gonads has been practised. In other words, the tissues when deprived of the directing influence of the sex hormone still continue to develop to some extent along the original lines. It is doubtful whether complete suppression of the secondary characters of sex would be brought about even could the testes be removed very early in fœtal life, soon after their differentiation in the primitive genital trace. In this connexion the work of Meisenheimer and Kopec on insects is of special interest. These observers found that the removal of the gonads from the young larvæ of the gipsy moth (*Lymantria dispar*) was absolutely without effect on the development of the male and female adult characteristics. In their later experiments on the larvæ of the same moth they succeeded in grafting ovaries into males and testes into females, the transplanted organs persisting and sometimes becoming connected up with the genital ducts, the testis with the oviduct, and the ovary with the sperm-duct. Even in these cases the moths, on hatching, had the characteristics and instincts of the sex to which the larvæ belonged before operation, so that a male moth containing ovaries would pair readily with a normal female, and a female with grafted testes behave in accordance with its original sex when in the presence of a male.

In contrast to this may be cited the experiments of Steinach and Voronoff, who found that by cross grafting of ovaries and testes each sex could be made to assume to some extent the characters of the other. For example, Voronoff by grafting a testis into an ovariectomised goat produced horns resembling in size those of the male rather than of the female. Similarly, Steinach by means of ovaries implanted into a castrated male guinea-pig caused a hypertrophy and activity of the mammary glands of that animal. However, even in these cases a careful examination would reveal differences in structure sufficient to show that the animals did not correspond to the sex of the glands with which they had been grafted.

It would appear, moreover, that the dependence of the secondary sex characters on the gonads varies in different species, so that the results of castration are more striking in some animals than in others. Further, there is definite evidence pointing to the fact that there is a difference in the control exercised by the gonads in the case of the two sexes of the same species,

[1] Whitehorn, J. C.: Jour. Biol. Chem., xlv., 449.

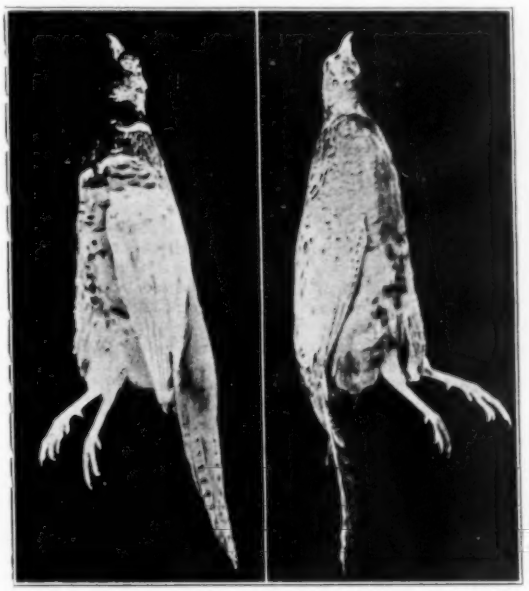
castration having a greater effect on the male in one species and on the female in another. Amongst fowls, for example, castration of the male results in the comb remaining small, the spurs poorly developed, and the male instincts suppressed. The plumage is, however, but slightly affected by the operation, so that the capon outwardly resembles a cock much more nearly than a hen. These changes may be summarised by saying that in the case of a cockerel the result of castration is infantilism. Removal of the ovary from a hen, on the other hand, causes the hen to assume to a very large extent the characters of the cock. The comb grows in size, and, what is more remarkable still, the plumage takes on to a great extent the characters of that of the cock. In other words, the result of castration in the case of the hen is not infantilism but masculinisation. The tendency shown by old hens in whom ovarian activity is on the wane to develop the attributes of the cock has indeed long been known by poultry breeders, and F. A. E. Crew has published an extremely interesting example of a transformation that occurred in a hen whose ovaries had been destroyed by tuberculosis. In this case the hen developed not only the plumage, crests, and spurs of the male bird, but also its aggressive nature, the power to perform the sexual act, and to fertilise eggs. Subsequent examination showed that the disease of the ovary had so altered the metabolism of the fowl that conditions favourable to the differentiation and growth of spermatic tissue had been created, with the result that new sex cords had been formed by the germinal epithelium. A complete sex reversal had therefore taken place. Goodale has made similar observations concerning the effect of removal of the gonads in the case of ducks, and has shown that whereas no alteration occurs in the plumage of the castrated male, removal of the ovary from the female causes the duck to assume gradually the typical plumage of the drake. It would seem, therefore, that in the case of birds removal of the ovaries has a more profound influence than removal of the testes. In mammals, on the other hand, the converse would appear to be true, removal of the testes having more effect on the development of the male than removal of the ovaries on that of the female. In human beings no direct observations are available, owing to the fact that removal of the ovaries early in life has very seldom been carried out. However, there is reason to believe that in man, as in other mammals, removal of the testes is more far-reaching in its results than is removal of the ovaries. Destruction of the testes early in life, either by operation or by disease, leads to the production of a eunuch who as regards certain characters, for example the development of subcutaneous fat, the growth of the breasts, and the distribution of the pubic hair, approaches the female. Disease or congenital deficiency in the ovaries is, however, not productive in the human being of male characteristics, but of infantilism. Masculinity in girls is not usually the result of disease of the ovaries, but of the suprarenals; new growths of that gland, as Blair Bell has emphasised, brings about precocity in boys and masculinity in girls.

These interesting differences in the response of the tissues to endocrine influence in the case of the two sexes all serve to emphasise the fact that the action of the sex hormone is not so simple as would at first sight appear. The development of secondary sex characters can no longer be regarded as resulting simply from the action on the tissues of a hormone elaborated in the gonads. The tissues play a less passive rôle than such a theory postulates, and tend to develop along certain definite lines, even when deprived of the directing action of the genital hormone. The imprint of sex has been placed on them at a far earlier date than was formerly supposed. Especially would this imprint of sex appear to have been placed on those specialised tissues that become the glands of internal secretion, so that it is not unlikely that other hormones besides those elaborated by the gonads play an important part in the development of the secondary attributes of sex. Exactly what that part is, and what action each member of the endocrine circle exerts on its fellow are, however, questions far beyond the scope of this paper. All that it is necessary for present purposes to remember is that the whole question of the influence of the internal secretion of the testis on the development of the secondary sex characters is far more complicated than was at first sight believed, and that the old view that these characters developed simply as the result of the response of plastic tissues to a stimulus supplied by a sex hormone is inadequate.

Inadequacy of the Hormone Theory in its Simplest Form.

Yet another proof of the inadequacy of the hormone theory, in its original simple form, to account for the development of the secondary sex characters is furnished by the existence of that rare but extremely

FIG. 1. FIG. 2.



Gynandromorphic pheasant.
Left lateral view showing plumage of cock and development of spur. Right lateral view showing plumage of hen bird and absence of spur.
(Illustrations kindly lent by Mr. C. J. Bond.)

interesting condition known to biologists as "lateral gynandromorphism." In this condition the individual develops characters of one sex on the right side of the body and of the other sex on the left. Gynandromorphs, although extremely rare in vertebrates, are not uncommon amongst insects. The best example of a vertebrate gynandromorph that occurs in literature is that of the bullfinch described by Poll. In this bird the male and female plumage were sharply separated on the two sides of the body, the right side of the breast being red, as in the case of the normal male, and the left side grey as in the female. On the right side there was found a testis and on the left an ovary. A somewhat similar case of gynandromorphism occurring in a pheasant has been described by C. J. Bond. In this case an ovitestis was found near the mid-line of the body containing well-marked ovarian and testicular tissue. The left side of the pheasant was male in character as regards plumage, development of the red skin surrounding the eye, the presence of a spur on the leg, and the size of the bones of the tarsus. The right side of the bird was female. Through the courtesy of Mr. Bond I have been enabled to publish a photograph of this interesting bird (see Figs. 1 and 2).

In the face of these curiosities it is necessary to presuppose that there exists a difference in the tissues of the two sides of the body, the testis or the ovary

acting as a stimulus to the development of the sex attributes rather than as a source of differentiation. In other words, in the cases of lateral gynandromorphism cited above, the localisation of sex gland and sex character in different halves of the body has a common genetic cause. They are not causally related the one to the other. As C. J. Bond has pointed out, what is true of these cases is also probably true of normal individuals, so that "in addition to the sex gland with its hormone secretion we must also recognise a somatic or peripherent factor in the causation of secondary sex characters. No amount of hormone will bring about the development of secondary male characters in individuals and in tissues in which the rudiments of such characters are absent. On the other hand, sex gland and somatic rudiments being given in heredity, the due development and the continued growth of the sex character depend on the presence of the sex gland and on the integrity of its internal secretion."

Is the Source of the Internal Secretion of the Testis in the Interstitial Cells?

It has long been known that in the testes of mammals in addition to the cells of the seminiferous tubules there are other elements lying between the tubules and known as the interstitial cells, or sometimes as the cells of Leydig. Within the cytoplasm of these cells may be seen various granules, acidophile, basophile, and pigmented, as well as certain peculiar crystals, the whole giving them the structural appearance of secretory gland cells. It is not, therefore, surprising that the theory should have arisen that these cells are responsible for the internal secretion of the testicle. This conception of the significance of the interstitial cells received such support from the experimental work of Ancel and Bouin published in 1904, that since that time the interstitial tissue of the testis has become known in French literature as the "glande interstitielle du testicule," and in German as the "Pubertätsdrüse."

Ancel and Bouin's arguments in favour of the interstitial cells forming the internal secretion of the testicle were based partly on observations on cases of cryptorchism and partly on animal experiments. They pointed out that in the retained testicle of man and of all other animals, although the seminiferous tubules are ill-formed, the interstitial cells are generally abundant. It is well known that, although a cryptorchid is usually sterile he is sexually fully developed. This association of virility with sterility can easily be explained if it be supposed that the internal secretion is formed in the interstitial cells. Moreover, the fact that in cryptorchism the interstitial cells are if anything increased rather than diminished in number would explain why an animal with a retained testis—e.g., the variety of stallion known in veterinary circles as a "rig"—is usually more excitable and sexually vigorous than an animal with a normally-placed gland.

Ancel and Bouin's experiments consisted in removing the testicle of a rabbit on one side and of ligaturing the vas on the other. On examining the testicle on the ligatured side some six months after the operation these workers found that whereas the tubules had to a very large extent degenerated as the result of the ligature a great increase of interstitial cells had taken place. This increase they regarded as a hypertrophy compensatory to the loss of testicular tissue on the opposite castrated side, and since the external secretory action of the testicle had been put out of action by the ligature, they deduced that it was the hormone-forming tissue of the gland that had hypertrophied. They also observed that in none of the animals used for this work was sexual desire impaired as the result of the operation. Indeed, in some cases ligature of the vas would seem actually to have increased the sexual appetite. As the ligature had brought about a regression of the tubules with a disappearance of all but a few spermatogonæ and Sertoli cells, Ancel and Bouin concluded that the internal secretion of the testicle must of necessity be formed entirely by the interstitial gland.

As a result, to a great extent, of this work the theory that the internal secretion of the testis is formed only in the interstitial cells has been generally accepted. Of recent years, however, various investigators have pointed out that Ancel and Bouin's proofs that the interstitial cells are the source of the internal secretion of the testis are by no means conclusive. Doubts have been expressed concerning the validity of their deductions and observations brought forward within the last few years that make it, in the writer's opinion, very difficult any longer to accept the view that the interstitial cells are entirely responsible for the elaboration of the internal secretion of the testis. Since a great deal of work, and particularly the work of Steinach in Vienna, has been based upon the assumption that the interstitial cells form the hormone if the testicle, it is worth while considering, in greater detail, the arguments that may be brought against this theory.

Arguments Against the View that the Interstitial Cells are Solely Responsible for the Internal Secretion of the Testicle.

Before reviewing the facts that stand in opposition to the theory of Ancel and Bouin, it is to be noted that a hypothesis that locates the formation of an internal secretion in the tubules rather than in the interstitial tissues is in closer conformity with what is already known of internal secretions in general. The seminiferous tubules are ectodermal in origin, and it is from the ectoderm that the glands of internal secretion are generally derived. The interstitial cells, on the other hand, would appear to be mesoblastic structures appearing in the primitive genital trace at a very early phase of embryonal development before the seminal cells have assumed their cytological character (Biedl). It is unusual for structures derived from mesoblastic tissues to assume the work of furnishing an internal secretion. Nor is the fact that the seminiferous tubules have already the work of forming the external excretion, in itself an argument against their being responsible for the elaboration of the internal secretion as well, for we have the well-known precedent of the hepatic cells that are responsible for both the glycogenic and the biliary function of the liver. On a priori grounds, therefore, the view that the internal secretion of the testis, as well as the external, is formed by the cells of the tubules is not unlikely.

For the sake of brevity, the arguments in favour of the internal secretion being formed by the tubules of the testis may be summarised as follows:—

1. Although it is true that there is no spermatogenesis in the tubules of the cryptorchid the germinal cells of the tubules are always present, as well as the interstitial cells. The possibility, therefore, that it is in the former rather than in the latter cells that the internal secretion of the testis is formed can never be altogether excluded. No case has yet been recorded of the development of secondary sex characters in the complete absence of all tubular elements.

2. The commonest type of hermaphrodite found in man is an individual with the secondary sex characters of the female (breasts, hair development, distribution of fat, psychology, &c.) and the primary sex glands of a male. A section of the testicle in such a hermaphrodite always reveals the presence of numerous well-formed interstitial cells which, as in the case of the testicle of the cryptorchid, are generally increased in number. If it be assumed that these cells are the seat of formation of the internal secretion, it is difficult to understand why in the face of this superabundance the secondary male characters of the hermaphrodite should have entirely failed to develop.

3. Although ligature of the vas produces definite changes in the tubules, these changes are generally in the nature of regression rather than of complete destruction. After ligature the spermatoblasts, spermatocytes, and, to a variable extent, the spermatogonia, disappear, but the cells of Sertoli escape, so that the possibility that these elements form the internal secretion can never be excluded. Moreover,

the action of the ligature is not permanent, since if the examination of the testicle be postponed, say, for a year after ligature, a rehabilitation of the tubules will be found to have taken place. That this regeneration of the tubules is not due to any re-establishment of the patency of the vas is proved by the fact that the lumen of the vas, as well as that of the tubules, is found to be distended with fluid. These observations of Steinach on the temporary nature of the results produced by ligature of the vas have since been confirmed by other workers, and notably in experiments on dogs.

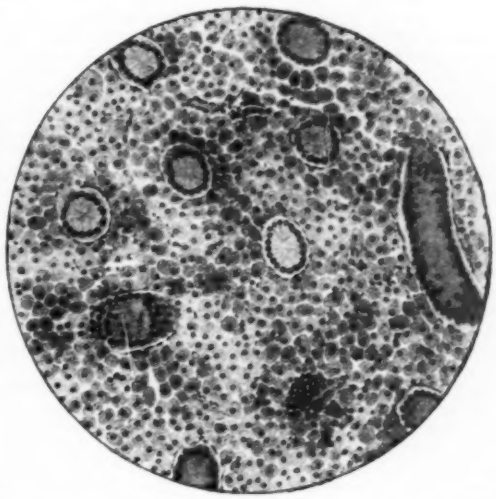
4. Lipschütz has shown by means of partial castration experiments carried out on animals that there is no normal relationship between the number of interstitial cells in the testis and the degree of masculinisation of the animal. Although masculinisation never occurred in the absence of interstitial cells, he found that as little as 1 per cent. of the total tissue of the testes was sufficient to bring this masculinisation about. In the face of this observation it is impossible to agree with Ancel and Bouin that the increase of interstitial cells seen in their ligature and castration experiments was in the nature of a hypertrophy compensatory to the removal of the testis on the opposite side.

5. In many of the lower animals, such as the triton, no cells resembling the interstitial cells of the mammalian testicle can be found. It is difficult to believe that in the higher animals a transference of the endocrine function from the tubules to the interstitial cells could have taken place, since this would mean that a function originally due to epithelium had been handed over to connective tissue.

6. Voronoff and Retterer have shown that when a testicular graft is removed and examined histologically it is found to be composed entirely of cells derived from the tubules. These resemble in appearance the cells found in the tubules of an infantile testicle, and a careful search shows that the interstitial cells have completely disappeared. Nevertheless, these grafts in the case of Voronoff's experiments with castrated goats had been sufficient to bring about the masculinisation of the animal, and were, therefore, it is to be presumed, a source of sex hormone. My own observations, to be described later, confirm this view that the interstitial cells rapidly disappear from testicular transplants, the germinal cells of the tubules alone surviving.

7. In animals whose sexual activities are subject to a seasonal variation, a definite cycle of change may be observed to occur in the histological appearance of the testis. This cycle has been studied by different observers working with different animals, and although discrepancies occur in their interpretation, the balance of opinion would appear to be that the changes seen are not such as to support the view that the interstitial cells are the source of the internal secretion. Champy, in studying the testes of the batrachia, noted the presence of a large number of interstitial cells during the period of rest. These disappeared with the onset of the period of sexual activity. In the dormouse and the camel, who breed only in summer, and in the kangaroo and the stags, both of whom have an equally restricted mating season, he noted the same phenomenon. On the other hand, Stieve, in studying crows, arrived at the conclusion that the interstitial cells undergo no modification either qualitative or quantitative during the seasonal development of the testis, but that the tubules increase considerably in size. Benoit, however, repeating this work on certain tropical birds, maintained that there does actually occur a hypertrophy of the interstitial tissue, but that the hypertrophy is obscured by the great increase in the total volume of the testis that takes place at this time. My own observations on this subject have been made on moles who have a short breeding season during January and February. If a section of the testicle of a mole be examined in autumn, it will be found that the interstitial cells are so abundant that in a rough calculation they must form four-fifths of the total volume of the testis. When suitably stained the cytoplasm is seen to contain numerous granules of lipoid material. The tubules, on the other hand, are in a resting state, and there is a total absence of spermatogenesis (see Fig. 3). At the beginning of December the picture is somewhat similar, but the relative volume of the interstitial cells to the tubules has diminished. In January and February the

FIG. 3.



Section of testis of a mole in September, showing enormous development of the interstitial cells associated with a condition of rest in the tubules. Section stained by Scharlach R, to show the lipoid granules with which the interstitial cells are heavily charged.

tubules have increased enormously in volume and the interstitial tissue has become relatively insignificant.

Whatever may be the significance of this cycle of changes occurring in the testes, it is difficult to find any satisfactory explanation based on the supposition that the interstitial cells are the source of the internal secretion. If Ancel and Bouin's theory is correct, why do the cells responsible for the sex hormone loom so large at a time when the sexual activity of the animal is nil, and how can we explain their gradual diminution as the period of rut draws nigh? Some other explanation of the rôle played by the interstitial tissue must be sought.

The Function of the Interstitial Cells.

If the interstitial cells do not form the internal secretion of the testis, what is their function? The most probable answer to this question is that they are trophic cells, whose part it is to take up nutritive material from the blood and to pass it on to the tubules. Régaud, indeed, has shown that some such substance does in actual fact pass from the interstitial cells to the cells of Sertoli.

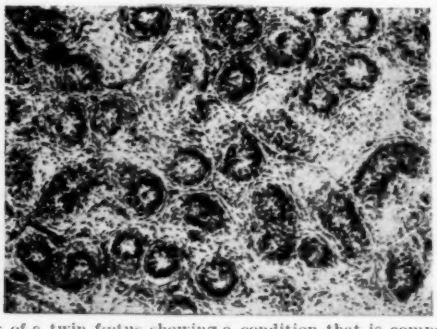
The testes, especially those of animals with a rutting season, are, as we have seen, subject to great changes in their state of activity. From the condition of rest they are plunged into one of intense activity, and in the case of the animal with a limited breeding season this change is associated with a great increase in the size of the tubule. In order to facilitate this sudden change from rest to activity the existence of a store of nutrient material ready at hand is of great importance, and it is in those animals in whom the change from rest to activity is most abrupt that this convenient store of material is actually found, in the form of large masses of interstitial cells heavily laden with lipoid granules. In animals, like man and the dog, who are capable of breeding all the year round, and on whose testicle no sudden demands are made, the warehouse of interstitial cells is comparatively small.

If we turn from comparative anatomy to a study of the development of the human testis from fœtal life until the onset of old age, again we find facts that suggest that the interstitial cells furnish a storehouse of nutritive material for the tubules rather than an internal secretion.

The Interstitial Cells from Birth to Old Age.

A microscopic section of the human testis at or just before birth resembles that of a mole during the resting season, inasmuch as the interstitial tissue appears more abundant than the tubules (Fig. 4). When suitably stained and examined under a high power many of the interstitial cells are seen to be full of a lipochrome substance distributed in the form of granules throughout their cytoplasm. In the seminiferous tubules no differentiation of the cells has at this time taken place. After birth a fairly rapid increase in the seminiferous tubules occurs, so that at four months they would appear to have nearly doubled in size (Mott). During this period of rapid development of the tubules the interstitial cells become less plentiful and the cytoplasm of those that remain appears less heavily charged with granules than was the case at the time of birth (Fig. 5). The testicles maintain this condition until about the time of puberty, when a great increase in the interstitial cells is again noted the increase being followed by a rapid development of the tubules and by the appearance therein of active spermatogenesis. Throughout the years of vigorous sexual life the interstitial cells remain more or less constant, but with the onset of decline there occurs a slow diminution in their size and number. So long as spermatogenesis persists some interstitial cells are usually to be found, but with the cessation of the reproductive function they disappear. As, however, spermatogenesis is sometimes found in the testes of

FIG. 4.



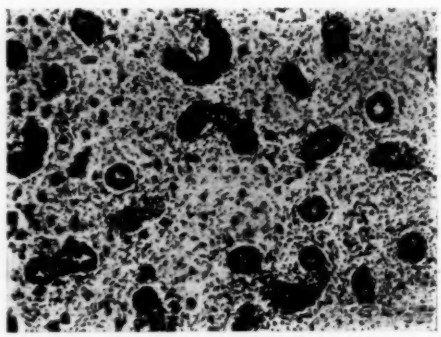
Testis of a twin fœtus showing a condition that is comparable to that seen in the testis of a mole during resting season. Between the tubules are a number of interstitial cells.

very old men the interstitial cells may in actual fact persist to a ripe old age.

The theory that the interstitial cells are trophic explains the single, life-long cycle of the human testis as satisfactorily as it does the annual cycle of the rutting animal. In each case the period of rapid growth of the tubules is preceded by a great accumulation of interstitial cells and lipoid granules. In the human being the periods at which this accumulation occurs is at birth and just before puberty; in the rutting animal it is during the season of rest. In both cases the number of interstitial cells diminish pari passu with the development of the tubules and the appearance of spermatogenesis. Equally satisfactory is the trophic theory in supplying an explanation of the appearance of the testis in cases of cryptorchism. In the cryptorchid the development of the testis has for some reason or other stopped short of spermatogenesis. What the actual cause of this arrest may be is immaterial, the point of importance being that the tubules remain inactive, and that as a consequence of this inactivity nutritive material accumulates in the interstitial tissue. The supply of trophic material here exceeds the demand.

So is it when an arrest of activity in the tubules is artificially produced by such an operation as ligature of the vas. Vasotomy, as Ancel and Bouin showed, is followed by regression in the tubules and an increase of interstitial cells. Their observations are correct but the deductions they draw from these observations are fallacious. The increase in the interstitial tissue is in the nature not of a compensatory hypertrophy but rather of an accumulation from disuse. Although

FIG. 5.



Testis of a child of 3. When compared with Fig. 4 it will be seen that a marked increase in the tubules has occurred at the expense of the interstitial cells, which in this section have entirely disappeared.

(Blocks of Figs. 4 and 5 kindly lent by Sir Frederick Mott.)

the sexual vigour of the animal may, as Ancel and Bouin observed, be augmented by ligature of the vas, this exaltation is not the direct result of the increase of interstitial cells. No direct relationship can be established between sexual activity and richness in interstitial cells. Stieve has, indeed, shown that the stuffed geese of Strasbourg possess more interstitial cells than normal geese, and that nevertheless they are less active sexually than the normal animal. Prominence of interstitial cells usually means accumulation of nutritive material, the surplus being due either to over-feeding or else to under-action of the tubules.

Roughly speaking, in the healthy testicle the prominence of the interstitial cells is inversely proportional to the activity of the tubules. With the onset of old age or in disease this balance is upset, so that a decline in the activity of the tubules is associated with a diminution in the interstitial cells. Complete degeneration of the germ cells is invariably followed by an equally complete degeneration in the interstitial cells.

Conclusions.

The conclusions that may be drawn from the above may be tabulated as follows:—

1. That although the testis, through the medium of its internal secretion, exerts an important influence on the development of the secondary sex characters, its acts as a stimulus to their growth rather than as the source of their origin.

2. That the other organs of internal secretion, such as the pituitary and the suprarenals, exercise a control over the development of the secondary sex characters which is only of less importance than that exercised by the testicle itself.

3. That the influence exerted by the various endocrine glands on the development of the sex characters differs in different animals and in the two sexes.

4. That the internal secretion of the testis is formed not by the interstitial cells but by the cells of the tubules.

5. That the interstitial cells store up nutritive material for the use of the tubules, their function being, therefore, trophic rather than secretory.

It is obvious that these conclusions have an important bearing on the organotherapy of the testis. If the internal secretion of the testis is only one of the factors regulating the development of the secondary sex characters it is obvious that too much must not

be expected of treatment by orchitic extracts or by testicular grafts in those cases of eunuchoidism in which deficiencies in the rest of the endocrine system exist. Moreover, if the interstitial cells do not form the internal secretion of the testis, the observation that they increase in number after the operation of vas ligature cannot be taken as a proof that the output of sex hormone has been correspondingly increased. In other words, if the function of the interstitial cells be trophic rather than secretory, the arguments in favour of Steinach's operation that are based purely on the histology of the testis after ligature fall to the ground.

These practical points will be discussed fully in a later paper dealing with the treatment of testicular insufficiency by means of testicular grafts and by Steinach's method of ligature of the vas.

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SCHISTOSOMIASIS IN CHINA:

BIOLOGICAL AND PRACTICAL ASPECTS.[1]

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FOLLOWING the discovery of a Japanese variety of schistosoma, *S. japonicum*, by Katsurada (1904) and Catto (1905), and the description of its ova as found in fæcal examinations, several missionary physicians in China observed in their clinics the presence of similar ova in stools of patients who suffered from Hankow fever, Kiukiang fever, Yangtze valley fever, urticarial fever, or some other locally-named malady. This Japanese form of schistosoma came to be accepted as an entity in China, but it occurred to me, in association with my colleague Dr. Henry Edmund Meleney, that the identity of the Chinese form with the Japanese worm must be established, and its life-history demonstrated, before further progress could be made in attacking the disease. We discovered a Chinese mollusc serving as an intermediate host, and this enabled us to tackle certain practical phases of the problem.

Plan of Investigation.

The course of events in the investigation which we carried out was as follows: (1) The development of the miracidium-sporocyst stage of the Chinese worm was first demonstrated in the Japanese snail. (2) The Chinese intermediate host was discovered in the Soochow area, and the experimental proof established that this was a true intermediate host of the worm, by infecting mice with cercariæ from infected Soochow snails, and infecting uninfected Soochow snails with miracidia hatched from Chinese eggs. (3) The development of the Japanese worm in the Chinese snail was then demonstrated.

The proof of the ability of the Chinese worm to develop in the Japanese snail was made possible through the gift of a large number of uninfected *Blanfordia nosophora*, which Prof. S. O. Yoshida, of Osaka, Japan, sent me in December, 1921. In February, 1922, we had under observation a Chinese patient with schistosome eggs in the stools. The stools of this patient were washed for several days, the miracidia hatched out, and a number of the Japanese snails subjected to infection. Previous to this time we had found that the ordinary molluscs of the Peking area—*Viviparus quadratus*, *Planorbis möllendorfi*, and *Lymnæa plicatula*—could not be infected with this species of miracidium. In the case of specimens of Blanfordia, however, the miracidia became positively attracted to the snail as soon as they came within a few millimetres of it, and proceeded to attack the nearest part of the mollusc. In this way a series of *Blanfordia nosophora* was obtained, infected with miracidia of *Schistosoma japonicum* from Chinese sources. This demonstrated clearly that the Japanese intermediate host of *Schistosoma japonicum* was susceptible to an infection of schistosome miracidia from a Chinese source. This led us to postulate that the molluscan host in infected districts in China must be either the same species of mollusc or a closely related one.

In order, then, to know the condition under which the snail was to be found in China, we studied the bionomics of the Japanese species, its preference for certain types of water, its relation to the various water levels, and the damp soil stratum immediately above the water line, as well as the level of the water at which it was attacked by the miracidia. From our observations we predicated that the snail would be found only near quiet, clear, shallow water; that it would more likely be found on overhanging moist banks at the edge of the water than in the water itself, and that infection by the miracidia would ordinarily occur just beneath the water level. We then chose Soochow, an endemic centre in the lower Yangtze Valley, where conditions were favourable for study, and during the month of August, 1922, Dr. Meleney undertook to discover the intermediate host of *Schistosoma japonicum* for that area. He made the Soochow Hospital his headquarters, and in coöperation with Dr. J. A. Snell, entered upon a search for the mollusc in the region immediately to the north and east of Soochow city, where clinical cases were known to occur. The party left Soochow by motor-boat along the main canal, passed north to the railroad bridge, thence by way of a secondary canal into a region which had frequently sent cases to the hospital. After some search in the rice fields, where only dry shells were found, a man was encountered with marked clinical symptoms of schistosomiasis japonica. Examination of fæcal specimens from persons hailing from a small village in the vicinity revealed eggs of *Schistosoma japonicum*. The village was observed to be on a terminal canal, and examination along the overhanging banks of this waterway just above the water's edge disclosed many specimens of a minute tapering snail, in many respects resembling *Blanfordia nosophora*. The snails were taken back to the hospital laboratory and dissected in the usual manner; 28 per cent. of the snails contained schistosome cercariæ, while one snail contained an oculate fork-tailed cercaria. The former were placed in a museum jar in water, and laboratory mice were submitted to infection. Fourteen days later one of these mice was autopsied, and about 100 immature schistosome worms were obtained from its liver and mesenteric veins. Another mouse was kept until the thirty-first day, when examination at autopsy revealed the presence of many mature male and female schistosome worms morphologically similar to Japanese specimens which we had previously studied. Some of this same collection of snails harbouring cercariæ were later taken to Peking and used to infect mice which had been born in Peking, and had, therefore, never been near an endemic area. Another collection of the same

[1] Abstract from an address recently delivered before the Royal Society of Medicine (Section of Tropical Disease and Parasitology).

species of snails within the city of Soochow, from the bank above the water's edge, was found to contain no infection, so they were submitted to an invasion of schistosome miracidia hatched out from local material. The snails were taken to Peking and kept in moist earth. After about three months they were placed in water, where they discharged large numbers of schistosome cercariæ, which were used to infect dogs. Many other species of snails from the Soochow area were collected and examined, but none contained the schistosome cercariæ. When examined later, none of these subjected to invasion by miracidia hatched from eggs of *Schistosoma japonicum* harboured schistosome larva.

In order to complete our proof of the ability of the miracidia of *S. japonicum* to infect any member of the group of closely related snails, certain of the Soochow schistosome snails that were known to be uninfected were submitted to an infection with miracidia hatched from eggs obtained from the fæces from dogs that had been infected with Japanese material. These were equally infectible: the miracidia readily attacked them. On examination about ten weeks later these snails contained mature and maturing cercariæ. The mollusc harbouring the schistosome cercariæ from the Soochow area has been kindly identified for us by Mr. Bryant Walker, of Detroit, Michigan, who regards it as *Oncomelania* (*Hemibia*) *hupensis*, Gredler.

Life-History of Schistosoma Japonicum.

The purpose of this portion of the study as worked out by us was twofold: (1) To obtain certain biological and morphological data in respect to the worm which were doubtful or obscure; and (2) to determine certain phases of the life-history which might be used as barriers in undertaking control of the infection.

The egg of *Schistosoma japonicum*, when first laid by the female, is a double convex oval disc, with a thorn or abbreviated spine on one side near the anterior end. It is always present in the immature eggs, but is usually much less conspicuous in the mature egg. The mucoid secretions from the lateral glands of the miracidium within the egg-shell ooze out through the shell and serve as an outer sticky cover for the egg. The eggs hatch best in a water medium, where fermentative agents are reduced to a minimum. In pasty stools exosmotic phenomena soon set in and produce the death of the miracidium within the shell. The miracidium dies in a medium above 45° C., but will survive a temperature of 4° C. for months at a time. It will live in freezing temperatures for a brief period (as low as minus 17° C. for an hour or less) provided the medium is water and not fæces. It seems probable, therefore, that the eggs can survive all water conditions which obtain in endemic areas, but soon become non-viable in night-soil dumps which are exposed to the weather.

The miracidium of *Schistosoma japonicum* displays a chemotactic response, not only to the susceptible mollusc when this chemotaxis is once established, but also to the mucus secreted by the mollusc. Experimental data show that all soft parts of the susceptible snail are not only equally liable to attack, but also to penetration. In other words, there is no selective penetration since invasion through the tissues of the head is as common as penetration of the gill filaments. In the former case, as in the latter, the miracidium penetrates the tissues *as a miracidium*, with its full equipment of cilia and secretory glands. Several days elapse before these structures disappear. In the meantime the larva has either secured entry into the lymph spaces of the mollusc or has developed an artificial lymph space around itself; sooner or later it gains access to natural lymph channels. The development of primary and secondary sporocysts, and the development of the fork-tailed cercariæ to maturity require a period of seven to nine weeks. Under natural conditions in the field, seven weeks is probably the period ordinarily employed.

It appears that the mature cercariæ accumulate within the snail until a certain tension of the host tissues develops, when they erupt spontaneously. When infected snails which have been dry for some time are placed in water they discharge their brood within a few hours. If they are taken out of water and placed in dry earth for a period, then later returned to the water, a second discharge usually results, although this is not ordinarily as heavy as the first. Cercariæ of *Schistosoma japonicum* ordinarily swim out of the snail-shell tail first, employing an anchor-fluke movement. Soon after a brood has been discharged they are seen to congregate under the surface-film of the water immediately above the snail, where they become pivotted by the attachment of the ventral sucker to the surface-film. Any object which comes in contact with this surface-film is likely to remove cercariæ from the water. It seems probable, therefore, that the actual first contact of a schistosome cercaria with a suscepible mammal is a fortuitous one, and is not superinduced by a chemotactic stimulus as is that of the miracidium for the susceptible mollusc host.

Invasion of the Mammal through the Skin.

The cercaria attacks the skin with the capillary ends of its cephalic ducts, pouring out through them the proteolytic ferments secreted by the cephalic glands. During this period, if not before, the tail of the organism is dropped, so that the larva enters the mammal not as a cercaria but as an agamodistome. Penetration may be effected in a few hours or may require a longer time. The earliest stage at which we have been able to recover young living worms from experimental animals is 23 hours after infection, when specimens were obtained from the popliteal lymph-node of the rabbit. It usually requires two days or more for them to reach the venous circulation. They pass immediately through the heart to the lungs, where a certain number, particularly in heavy infections, penetrate the tissues of the lungs, producing lesions thereby, and thus reach the pleural cavity. They become side-tracked here, however, and, unable to continue their course, degenerate in a few days. The majority, however, pursue the normal course and pass through the capillaries of the lungs into the arterial circulation. They apparently have an equal distribution throughout the systemic circulation, since at this stage they are recovered from peripheral, renal, and splenic arteries, as well as from the mesenteric system. But only those that get through the mesenteric capillaries into the portal system arrive at a suitable location for growth. The others behave as foreign-body emboli, and are probably the cause of the dermatitis observed early in the infection. The course within the body is, therefore, one definitely involving blood-channels.

Development and Pairing of Adult Worms.

While a certain development takes place during the migration from the skin to the portal system, functioning of the digestive tract takes place only after arrival within the portal vessels. It seems highly probable that the young schistosomes first pass into the intra-hepatic portion of the portal vessels, where they reside until sufficient muscular development has been attained, so that they may crawl back into the mesenteric veins. Here they mate (at about the seventeenth day) and become adult, some as early as the twenty-fifth day. Worms at this time lie in the smaller mesenteric veins and even in the capillaries, where the eggs are laid, and, by pressure, and later by digestive ferments from the miracidium within, break through to the intestinal lumen.

During the migration from the skin to the portal system, but more particularly later within the portal system, the worms respond to a definite growth stimulus. Our first experimental worms were recovered from the liver 70 hours after infection, but migration from the lungs continues through to the seventh day, after which time the worms are too large to pass the capillaries, and, having used up all of their digestive-gland secretions, are unable to migrate of their own accord.

Distribution of Schistosomiasis in China.

Altogether the endemic territory in China is much more extensive than the five known infected districts

in Japan. The latter amount to considerably less than one-tenth the known territory endemic for the disease in China, and are, in reality, minute replicas of the Chinese area, although on the whole they are probably more intensively infected. While foreign sport dogs are commonly found to harbour the disease in endemic areas in China, native dogs are less heavily infected, possibly due to their dislike for water. In China man alone is the important definitive host of the disease.

Diagnosis and Therapy in Schistosomiasis Japonica.

Little careful study has been made in China of the early stages of schistosomiasis. The natives do not seek medical assistance for the infection until it is far advanced, while most early cases which are diagnosed by the presence of eggs in the fæces are usually afflicted with more serious complications.

Houghton (1910) has classified the advanced cases as follows: (*a*) Typical cases, with large liver and spleen, and with fluid in the peritoneal cavity and blood and ova in the stools. (*b*) Cases showing only splenic enlargement, with or without blood or ova in the stools. (*c*) Cases negative except for marked eosinophilia. (I have indicated my doubts about the specificity of a high eosinophil count under such circumstances.) (*d*) Latent cases, showing ova in the fæces, but no bodily reaction.

The earlier treatment of schistosomiasis in China was entirely symptomatic. In Japan quinine and arsenicals were tried without success. In 1913 Hutcheson used emetine on some of his cases in Kashing, and believed that the drug deserved further trial. Following the introduction of tartar emetic treatment for Egyptian bilharziasis by Christopherson in 1917–18 certain hospitals in China undertook to use this drug in their schistosomiasis clinics. In all cases within my knowledge the patients have been taken into the hospital and treated in the wards. Clinicians in China, who have given tartar emetic a trial, agree that "results are uniformly good when patients have stayed in the hospital until pronounced cured, and when complications have been avoided." Tootell (1923), of Changteh, Hunan, reports cures for 50 per cent. of all patients who received treatment, while 29 per cent. more were improved, although they still harboured eggs on leaving the hospital before treatments were completed. In other centres where the treatment has been given a fair trial similar success has been attained. Although Reed (1915) regards emetine as ineffectual, Tyau (1922) favours its use.

Control of the Disease in China.

Prophylactic measures have been undertaken under government supervision to wipe out the molluscs in the endemic areas of Japan. The most successful and practical method yet devised consists in liming the banks along the infected or suspected canals and drainage ditches. In China, the simple but effective measures adopted by the Japanese are still impracticable. In the first case the intermediate host is known as yet only in the immediate vicinity of Soochow, Kashing, and Shaohsing. While the distribution of the disease leads one to believe that the mollusc involved has the same habits of existence in all endemic centres in China, the actual proof yet remains to be demonstrated. In the second place, the whole endemic territory in China is a tremendous one. Neither the disease nor the mollusc is equally distributed over the Yangtze Valley. The infected areas are confined especially to certain districts, such as Soochow, Kiukiang, and Changteh. A practical programme involves a search for the intermediate host in such areas of heavy endemicity, gradually working out from these centres to the districts of lesser infection. It must be remembered, however, that such a programme requires considerable skill on the part of the surveyor, since the mollusc is minute, is easily confused by the layman with immature specimens of the ubiquitous *Melania cancellata*, and is unknown to the natives. On the whole the problem in China seems more likely to be solved on the basis of night soil control. One more fact must be kept in mind in considering such an undertaking so intimately concerning the native farming class—namely, their suspicion that only harm can result from any stranger trespassing on their domain. Coupled with this is the improbability of securing any government coöperation at the present time in China. In spite of these unpleasant facts, the problem of eradicating schistosomiasis from China is ultimately a hopeful one. One must bear in mind that China is an ancient country, that she moves slowly and deliberately, but that she moves surely. The next 50 years will bring much in the way of reorganisation and development in China. It seems not too much to expect that public health and preventive medicine will follow closely upon the steps of improved agriculture and commerce, and that in this scheme of affairs schistosomiasis will not long be allowed to remain an uncontrolled infection in the heart of the country.

Summary.

In working out the problem of schistosomiasis japonica for China, the development of the miracidium-sporocyst stage of the Chinese worm was first demonstrated in the Japanese intermediate host, *Blanfordia nosophora*.

Following this the Chinese intermediate hosts were discovered in the vicinity of Soochow, Kashing, Shaohsing, Fatshan, and experimental proof of their right to this claim was established.

The development of the Japanese worm in the Chinese snail was then demonstrated.

The important factors in hatching of the egg are the maturity of the miracidium and lack of fermentative agents in the medium. The larva withstands cold, but dies at temperatures above 45° C.

The miracidium may enter the tissues of the molluscan intermediate host either by way of the gill filaments or by penetration through the solid tissues of the head or foot.

The cercaria attacks the skin by pouring out proteolytic ferments through the capillary ends of the cephalic ducts, thus digesting and mechanically battering its way through the skin of the definitive host.

Penetration once effected, the young worm utilises the blood channels for its migration through the body to the portal vessels, normally passing through the capillaries of the lungs and thence by way of the left heart into the systemic circulation. While the chances are equal that the worms will pass to all parts of the systemic circulation, only those that pass through the mesenteric capillaries into the mesenteric veins are able to continue growth. Mating has been observed as early as the seventeenth day, and mature eggs have been found in fæces 28 days or later following infection.

The disease, schistosomiasis japonica, has a wide distribution throughout the Yangtze Valley, but is particularly well established in the regions around Soochow, Kiukiang, Tsaoshih, Wuchang, Yochow, and Changteh. It has been located in isolated districts on the central Szechuan plain, in southern Chekiang, at Foochow, above Swatow, and on the North River above Canton.

With a full course of tartar emetic treatment available, about 50 per cent. of the patients suffering from schistosomiasis are cured, while another 29 per cent. are improved. Still others come for treatment too late to secure effective therapeusis. Antimony tartrate is, in most cases, specific for the infection.

While the methods adopted in Japan for eradicating the mollusc host are still impracticable in China except in certain limited areas, it seems reasonable to believe that in the course of a few years measures will be effected to stamp out the infection in China.

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THE DEVELOPMENT OF MODERN ANTI-MALARIA CAMPAIGNS.

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UNTIL an absolutely certain and specific remedy for malaria, in the form either of a protective serum or vaccine or curative drug is discovered, the disease must on the large scale continue to be fought indirectly and somewhat expensively by waging war against its anopheline vectors. Even then, unless the serum, vaccine, or drug were to have the improbable power of inducing a comparatively permanent immunity to malaria, the disease, in its hot-beds, would still have to be combated by campaigns against its vectors. To-day, all over the world, owing to the great increase in wages of even manual labour in the tropics, the expensiveness of this only satisfactory means of fighting malaria is so marked as to cause considerable embarrassment to continued anti-malaria work in many regions. While labour was cheap, obviously it mattered little whether more than the strict essentials of the work were carried out, and we could adopt as our working principle "oil, drain, or fill up all anopheline breeding places in malarious districts"—a simple and satisfactory principle, but one which by recent intensive study of anopheline bionomics we see actually incurs much unnecessary work.

Formerly, working on the old principle, it was sufficient to determine the presence of anopheles locally, and the anti-malaria measures could be safely left in the hands of sanitary engineers and drainage experts. Beyond demonstrating that anopheline larvæ were in the ponds, marshes, streams, &c., and that they no longer existed after the work had been completed, the services of the entomologist were practically uncalled for. Now that the cost of labour has so greatly increased we have discovered that the old principle of developing a sweeping attack against all the anopheline breeding places in a given area, however good the final results may be, is comparable in its extravagance to engaging an enemy on every front, when by a slight study of the tactical position a few master strokes would bring victory without a tenth of the effort or expense.

The new principle to be applied to modern anti-anopheline projects may be defined as "drain or fill up *only* the breeding places in which the *definitely proved* anopheline vector is to be found—disregarding all other waters, no matter how 'typical' they may appear." In following this new principle the full services of skilled entomologists are the foundation and insurance of successful work. In work of this kind, *ipso facto*, the entomologist must rank as general and chief of staff, as it is upon his investigations and plans the success of the campaign depends. Anti-anopheline work is purely entomological work, and modern anti-anopheline work demands the most careful bionomical study of the particular species of the anophelines which are to be dealt with.

Failure of the Mauritius Campaign.

I need only indicate the position and the causes of failure of the anti-malaria campaign in Mauritius, which I have studied recently, to make this point clear. Primarily, owing to insufficient entomological investigations, it had been assumed that only one definite vector of malaria existed in the region. No study of the local specific bionomics of this species had been made, and an extensive and costly anti-anopheline campaign was started with no less an aim than the eradication, as far as possible, of all actual, and what were considered to be potential, breeding-places. No definite plans were evolved other than the oiling, draining, or filling in of what were considered typical noxious waters; the "natural balance" in nature was neither studied nor considered except in so far as assuming that by the importation of large numbers of larvivorous fish the anopheline larvæ would be effectually checked. Moreover, the services of an entomologist had not been utilised for 15 years, the whole of the work being left in the hands of willing but quite out-of-date sanitarians.

After a modern survey of the situation it was found that instead of one anopheline vector three were actually responsible for the intensely malarious condition of the region, and furthermore, that the species formerly regarded as the vector, possibly in certain parts of the island ranked only second in importance. Also it was found that much of the anti-anopheline work which had been accomplished was unnecessary; worse still, by the manner of its execution this work had, in some localities, provided good breeding conditions for what was found to be the other important vector. In addition, it was discovered that waters which had been looked upon as harmless harboured two of the vector species, while another unconsidered type of water harboured the third vector. Naturally all the efforts of the existing anti-malaria organisation had largely failed to produce any amelioration of the malarious condition of the country, and the whole position was to be accounted for simply by the absence of a competent entomologist who could have directed the campaign according to the tactics he found necessary under the local conditions.

Necessity of Dealing Only with Proved Vectors.

Recent study has shown that efficient and economical anti-malaria campaigns can only be attained by the most precise investigation of the bionomics of the local anopheline vectors, so much so that immense dissipation of effort and money is likely to take place unless a full account of the bionomics is available. The old principle of "oil, drain, or fill-in all dangerous waters," in other words, must be relegated to the past as both extravagant and totally unscientific. In an area where malaria is rife obviously the initial investigation should be to determine what species are present, and since the malaria-infectivity of the anophelinæ varies from zero to a high percentage, which species are locally concerned with the transmission of the disease. By modern technique the latter question can now be quite easily determined experimentally, as most of the factors governing mosquito infection and mosquito life in captivity have been ascertained.

It will usually be found that, at most, one or two species in any given region are the important vectors. Hence the necessary anti-anopheline measures are at once narrowed down to dealing only with these proved vectors, and need not involve any attempt at a general slaughter of all anophelines. It then becomes essential to determine the larval and pupal characters of the incriminated anopheles, so that these shall be easily recognised in all their stages of development; and when this is accomplished careful study and registration of all the breeding places must be undertaken. Recognition of the types of breeding places is highly important, but even more important is the registration of the breeding places where the larvæ are actually found.

Underlying the supreme importance of this registration is the common but at present incompletely explained phenomenon that waters with apparently identical geographical and physical characters do not always afford breeding places to the anopheles. Frequently certain waters may harbour innumerable larvæ of the noxious species, while even within a stone's throw of these breeding places, in other seemingly identical waters, no larvæ are ever to be found. Apparently this is due to variations in the pH reaction of these waters, and I have found the use of pH indicators of the greatest value in determining whether any particular water affords normally suitable conditions for anopheline development. It has been found that most of the anophelinæ—probably all except the tree-hole breeders—demand waters with either a neutral or alkaline reaction, and that waters with an acid reaction are unsuitable as breeding grounds. Obviously, therefore, the initial work of the anti-malaria staff is again narrowed down to dealing primarily with the registered breeding places, and not generally with waters of a certain type. Thus the enemy is attacked at once at the positions of its greatest concentration; heavy slaughter follows, markedly reducing with a minimum of effort the numbers of anophelines in the locality. Observation must, of course, be kept upon the apparently identical waters in the vicinity to ensure, with the main breeding places destroyed and with possible changes in the pH index, that the species does not resort to waters from which it has been formerly absent.

In my experience, however, I have found that apparently similar waters which are unsuitable to the species under normal conditions rarely alter. The inimical qualities of these waters, under normal conditions, are usually too great to permit the larvæ to adopt them even when the naturally suitable breeding places no longer exist. Not infrequently I have found in the study of the breeding places of malaria vectors that the types of the breeding places of certain species are so peculiar as to limit the necessary anti-anopheline measures to an astonishing degree, indicating the immense extravagance and futility that widespread oiling, draining, and filling-in operations would involve.

"Natural enemies" in mosquito control are still sympathetically regarded by some people. The idea of utilising a natural force to undertake the necessary labour for us is, I admit, attractive, and not without its element of romance, but I maintain, after attention to this question for many years, that in most anti-malaria campaigns the successful utilisation of "natural enemies" in anti-anopheline work is impossible. Under unnatural (artificial) conditions larvivorous fish are the only "natural enemies" that, in a limited manner, are useful in the destruction of mosquito larvæ. Under natural conditions larvivorous fish have practically no influence in the reduction of the numbers of the larvæ. The fish have to toil for each larva they consume, and Nature's balance provides the larvæ with barriers against the attack by fish—the result being that where one larva is killed, provision is made for the development of another. Consequently, in anti-malaria campaigns, except in artificial mosquito breeding places, such as water tanks, ornamental ponds, drains, &c., fish are useless, and are apt to engender a false faith in palliative measures when direct and ruthless action for the abolition of the breeding places is the only policy of real value.

Propaganda and Instruction.

In all parts of the world to-day, by the conspicuous racial and individual development of peoples, anti-malaria measures which in the past would have been accepted in dumb faith are now frequently brought sharply under public criticism, for good or ill, according to the degree of public enlightenments Careful propaganda and instruction to communitie. by those in charge of modern anti-malaria campaigns is, therefore, of the utmost importance, and the foundations of success are to be laid by preliminary discussion of the objects with the leaders of the communities, followed by concurrent instruction of the people as each of the details of the campaign is undertaken. Each individual who understands the aims thus becomes a nominal member of the anti-malaria staff, and can be made to render invaluable service and relief to the efforts as a whole, instead of developing a policy of obstruction by regarding himself as subject to irritating and needless obligations.

Since it may be said that the foundation of economic and modern anti-malaria campaigns lies in the adoption of direct and permanent measures against only the proved breeding places of the definitely incriminated vectors, and the avoidance of all measures that are merely palliative or which aim at dealing in any locality with the anophelinæ in general, it follows that the command of such campaigns must, in future, rest with the chief entomologist and his staff; these experts will progressively regulate the attack against the vectors in accordance with the measures that are proved necessary, so minimising the expense and length of the campaign, and evading valueless or unnecessary effort.

Medical Societies.

MANCHESTER PATHOLOGICAL SOCIETY.

A MEETING of this Society was held on Dec. 12th, 1923, Dr. E. B. LEECH in the chair.

Dr. J. H. DIBLE opened a discussion on

Pneumococcal Infections,

and was followed by Dr. G. J. LANGLEY. These papers appear in the original columns of THE LANCET this week.

Mr. E. E. HUGHES, speaking of surgical infections, said that pneumococcal peritonitis was a disease of two varieties. The secondary variety affected persons of all ages and sexes, and was a sequence to some active pneumococcal infection in another organ. The primary variety was a disease of girls of about the ages of 2 and 11. This period corresponded to one of active development of the vagina, whilst the vaginal secretion had not yet developed its characteristic acid reaction, and suggested a vaginal infection as the route of entrance of the pneumococcus. The work of McCartney and Frazer had shown that this was the case. In pneumococcal peritonitis the lesions commenced in the pelvis, and the same type of pneumococcus had repeatedly been isolated from the vagina, peritoneum, and blood. Experimental work on rabbits and monkeys had confirmed this route of infection, whereas experimental blood infection was followed by septicæmia without peritonitis. The suggestion was that children at this age—and the disease occurred mainly in the poorer classes—became infected by sitting about upon doorsteps and pavements, and contracting direct infection of the vulva.

Prof. SHAW DUNN said that the conception of involvement of the lung, by spread outwards from the hilum, explained a number of points which had previously been obscure. He looked upon pneumonia very much as a cellulitis of the lung. It was difficult to understand why in some cases the same infecting

agent produced broncho-pneumonia and in others lobar pneumonia, and he was familiar with certain cases in which on post-mortem examination it was difficult to decide whether the condition was really to be designated lobar or broncho-pneumonia—a sharp line of division did not exist. He believed that the reason for such diversity of lesions was possibly a matter of magnitude of the infection; a single large dose might produce a lobar lesion, and a smaller one give rise to broncho-pneumonia.

Dr. A. H. HOLMES urged some objections against the idea of localisation of the early changes to the hilum. He thought that clinically the lesions were not found in that position in the early stages, and, further, that pleural friction was constantly an early sign and this would militate against such a localisation. He thought the disease might begin in the superficial part of the lung, and asked if cases were not met with at post-mortem where there was involvement of the outer portion of the lung and freedom of the root. He wondered if certain of the cases of peritoneal infection which were described as pneumococcal might not be in reality enterococcal infections.

Prof. MATTHEW STEWART said that he thought that the vaginal route of infection was an important one in streptococcal as well as in pneumococcal peritonitis, and quoted a case published by Adami bearing upon this point. With regard to the spread of the morbid process in the lung, he was familiar with cases of lobar pneumonia in which the whole lobe was consolidated except for its extreme edges, which might only show œdema and congestion, but not with the converse condition.

Dr. DIBLE, replying, said that he had never seen pneumonic consolidation of the lobar disease involving the periphery and sparing the centre. He doubted very much if auscultation and percussion would reveal deep-seated early changes in the lung root, and he thought that it was this localisation which was responsible for those cases of "central pneumonia" in which physical signs only appeared late. Early pleural friction was not a bar to the acceptance of the centrifugal spread of the disease as the distance of the pleura from the hilum was only a short one in the root region. He thought that the discussion had shown that the hæmatogenous theory of invasion had now been overthrown in two of the chief pneumonic infections. Bacteriologists realised, probably more acutely than others, from experimental experience, that the blood could usually look after itself in regard to most bacterial infections, and he believed that in the other chief pneumococcal infection—meningitis—the route of invasion was by the Eustachian tube or cribriform plate, and that here, too, the hæmatogenous theory would be shown to be incorrect. In considering the production of broncho-pneumonia he thought that Prof. Shaw Dunn's remarks had left little to be said save that bacterial virulence must also be taken into account, but this was a matter which at the present time was very difficult to assay.

Dr. LEECH thanked the speakers and concluded the discussion.

LIVERPOOL MEDICAL INSTITUTION.

A MEETING was held on Dec. 20th last, Prof. J. HILL ABRAM, the President, being in the chair.

Mr. JOHN T. MORRISON read a note on the

Treatment of Tuberculous Sinuses.

He pointed out the necessity for an efficient and at the same time labour-saving method in a condition of such chronicity and seriousness. He took for granted attention to general treatment along the most approved lines, and went on to speak of the operative treatment—radical operation in a minority of cases, in others removal of sequestra, scraping out a caseous gland, counter incision, and so on. In most, however, patient attention to daily dressing is all that is indicated. For this purpose he believed bipp carefully used to be most suitable. The technique involved strict asepsis. After passing a fine rubber tube to the limits of a carefully explored track, he aspirated pus and then washed out with spirit. Bipp suitably diluted with liquid paraffin was then injected so as to fill the track from the bottom up. The bipp should never be stiff enough to dam back discharge or so thin as to run out of a dependent opening. A dry dressing carefully secured in place may be left a week, ten days, or longer, and should not be touched until an indication arises. The need for re-dressing is enormously diminished and patients so treated, provided the whole of the diseased track is reached, do well, some healing rapidly. The treatment should not be used where active inflammatory trouble is present and only with caution in abdominal sinuses. Chest sinuses are suitable, however, even those with bronchial fistulæ. Cavities in the chest up to half an ounce capacity may be filled with bipp; the larger ones should merely have their walls coated with bipp sprayed on in ethereal solution. The bipp method of treating tuberculous sinuses was a useful addition to one's armamentarium under all circumstances, but when the surgeon was single-handed and skilled assistance inadequate it was invaluable to him.

Dr. NORMAN CAPON read a short paper on six cases of so-called

Hæmorrhagic Disease of the New-born.

He pointed out that examples of hæmophilia and of hæmorrhage secondary to conditions such as sepsis, syphilis, or enteritis should not be included in this category. After a brief description of his own cases, Dr. Capon drew attention to the various theories which have been advanced to explain the abnormalities of coagulation which appear to form the basis of the disease. It was probable that cases might be divided into two groups: one in which coagulation time is lengthened, with deficiency of prothrombin; the other with prolongation of bleeding-time, ascribed by various workers to deficiency of prothrombin, of blood-platelets, or of thrombokinase. The important clinical features were recorded and emphasis was laid on the efficacy of whole-blood administration. This remedy might be given by subcutaneous injection, or, in more severe cases, by intravenous transfusion, using either a superficial vein or the superior longitudinal sinus. The mother is generally selected as donor, and preliminary blood-grouping is then not necessary. Of Dr. Capon's cases five recovered and one died.

Dr. H. H. L. PATCH read a paper on

Dangers During the Administration of Anæsthetics.

Depression or failure of respiration and circulation due to the action of ether and chloroform in the various anæsthetic stages were discussed in detail, special mention being made of overdosage. The dangers of light chloroform anæsthesia were touched upon, with instances of too early a commencement of the operation causing reflex circulatory and respiratory failure. Commentary was made on the mental hyper-excitability produced by the hypodermic injection of atropine prior to the operation. It was held that the sphygmomanometer should be used in all serious cases, and that the accuracy in gauging the fall of blood pressure is a very important point both to the anæsthetist and to the surgeon. The usefulness of Hewett's airway was mentioned and the opinion expressed that with its use bronchitis is not found to follow an anæsthetic more frequently than without it. Dr. Patch held that bronchitis was due to irregular administration or previous disease. The latter part of his paper was devoted to difficulties and dangers found in anæsthetising patients suffering from fear and apprehension, from adenoids, in which condition he advocated ether, and from abdominal conditions. Conditions of spasm of the glottis and overdosage were considered, and finally the possibilities of diagnosing status lymphaticus before anæsthesia were discussed.

Dr. G. F. R. SMITH believed that the advantages of using a pre-operative dose of morphine out-balanced the disadvantages, and emphasised the danger of moving a patient suddenly.

Reviews and Notices of Books.

ANGINA PECTORIS.

By Sir JAMES MACKENZIE. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1923. Pp. 253. 30*s*.

Sir James Mackenzie gives here a most readable account of angina, illustrated by a wealth of clinical material, and at the same time illustrates certain methods of investigation which he considers essential to the practice of medicine. The two most interesting sections are the preface and the tenth chapter, for in these he deals in a broad way with the whole question of health and disease. In a valuable appendix the records of 160 cases are given, including reports of a number of autopsies (22). Sir James Mackenzie differs from some in refusing to consider angina as a disease with a fixed and definite pathology. It is to him a symptom indicating exhaustion of the myocardium, and he correlates the pain of angina with that of renal colic, pointing out that the process by which the symptoms of renal colic are produced is comparable to that provoking angina pectoris. He has here applied his theory of disturbed reflexes in the production of symptoms to the special symptom-complex of angina pectoris. The classification of primary and secondary angina is accepted. In the former he includes those patients in whom changes of a permanent nature are present in the heart. In the secondary the chief deviation from the normal is an undue susceptibility of the nervous system, the result of some influence other than the heart. This classification obviously carries with it certain clear indications as to treatment and prognosis in any particular patient, and the chapter on treatment is a careful exposition of the author's views. While much can be done by skilful management of the patient, he emphasises the fact that in the primary anginas it is wise to recognise that the organic changes in the heart are permanent—as permanent as grey hair and the arcus senilis—and that treatment must be such as to prevent exhaustion of the enfeebled muscle. It is generally accepted that, though there is no constant pathological condition found in the hearts of those dying from angina, nevertheless some degree of coronary disease is a common finding. The significance of coronary disease is, that narrowing of the coronary artery results in a lessened blood-supply to the myocardium, and in the opinion of the author the pain of angina is associated with muscular contraction, as in the case of renal and other colic; and he considers that muscular contraction is a stimulus adequate to cause anginal pain when there is a deficient blood-supply to the heart muscle. Sir James Mackenzie also discusses the origin of anginal pain in those patients in whom no disease of the coronaries is present.

We have in this book a valuable contribution to the study of heart failure—the result of many years of investigation of cardiac failure and of the mechanism of pain.

GRAFTS FROM MONKEY TO MAN.

Quarante-trois greffes du singe à l'homme. By SERGE VORONOFF. Paris: Librairie Octave Doin. 1924. Pp. 251. Fr. 20.

IN this new book Dr. Serge Voronoff has given the results of further work on the subject of testicular grafts. The book contains some of the matter previously published in "Greffes Testiculaires" (1923), as well as entirely new material. Dr. Voronoff starts with a summary of the events that led to his adoption of testicular grafts as a treatment for testicular insufficiency, premature senility, neurasthenia, and debility. He describes how, in 1920, in an attempt to avoid the absorption that inevitably follows the placing of a graft from one of the lower animals in the human body, he employed a testicle derived from an anthropoid ape. For this method of using grafts from an allied species he has coined a new term referring to such grafts as homeografts, to distinguish them from autografts (grafts from the same subject), homografts (from the same species), and heterografts (from entirely different species). As a result of his animal experiments on the subject Voronoff has found that fragments of tissue taken from an allied species survive for a far longer period than a heterograft taken from a widely different species. In other words, a graft from a goat when implanted in a sheep survives for a longer period than a similar graft taken from a dog. The anthropoids being the most nearly allied to man, Voronoff considers them the ideal source of grafts for the human subject.

In one of his human cases Voronoff was enabled to examine a graft that had been taken from an ape some 15 months previously. The examination showed that not only had the epithelium of the seminiferous tubes survived, but that actual proliferation had occurred, so that in many places the lumen of the tubule had been obliterated. Of still greater interest is a similar observation made in the case of a goat that had been grafted with the testicles of a young animal that had not yet reached puberty. When the grafts were removed at the end of 14 months it was found that the epithelium of the graft had actually evoluted during the interval, so that the heads of spermatozoa could be made out, all signs of spermatogenesis having previously been absent. On these observations Voronoff rests his claims that homo- and homeografts not only survive, but may even develop after transplantation. His clinical results at any rate appear to show that the benefit of grafting may be maintained for a period of three and a half years. In one of his cases, however, the effect of the graft would seem to have waned towards the end of the third year, and at the request of the patient—a man of 65—the operation was repeated with results equally happy to those achieved on the first occasion.

The technique used by Voronoff is simple, and is described in great detail in the work under review. The cavity of the tunica vaginalis is always chosen where possible. Should there be insufficient room within the cavity for all the grafts, some of them are attached to the outer surface of the tunica vaginalis, and in order to encourage vascularisation the area of implantation is lightly scarified. The grafts are always placed so that the glandular surface is opposed to the tunica vaginalis, and care is taken that no two grafts come into contact with each other. Following the description of the operative technique are the records of 43 human cases subjected to grafting. In all cases monkeys or baboons were used as donors, only those monkeys being selected which gave clear evidence of having attained the age of puberty, since in certain cases in which younger animals had been employed no results were obtained. Amongst the later articles in the book are papers by the author in collaboration with Dr. E. Retterer on Heterografts and on the correlation between the physiological phenomena and the structure of testicular grafts. These papers are of particular interest and lend support to the view that is rapidly gaining ground that the interstitial cells are not responsible for the elaboration of the sex hormone. As an entirely new application of the principle of grafting, Voronoff has studied the influence of grafts on the healing of wounds. Carrel in 1912 published in New York a note on the artificial acceleration of the growth of connective tissue cultivated in vitro, and showed that the growth of the tissue of a chicken that had been cultivated in vitro could be stimulated by adding extract of embryo to the culture-medium. This suggested to Voronoff that the healing of wounds might also be stimulated by the use of emulsions of various glands such as thyroid, suprarenal, pancreas, and testicle. By bringing fragments of different tissue into contact with the wound he showed that whereas pancreas undoubtedly inhibited healing, thyroid and testicle hastened it. This accelerating action exerted by testicular tissue on a healing wound is evidently not due to any general stimulation of the body, but

to an action that is entirely local. The precise nature of this local action is still unknown.

It is difficult to pass judgment at the present time on Voronoff's new contribution to the subject of testicular grafts. Time and the results obtained by other researchers on this subject will show how far we can accept the views which he puts forward. The subject is one on which the attention of the medical profession has become focused, and others are working along the same lines. However, it may at once be admitted that Voronoff and Retterer have made valuable contributions to the subject in their study of the histology of grafts removed some months subsequent to their vascularisation. That mental suggestion plays a part in the benefits obtained from grafting is certain, but that this can entirely explain the results is extremely unlikely. The book should be read with interest by all.

THE MEDICAL TREATMENT OF DISEASE.

Notes for Students and Young Practitioners of Medicine. Second edition. By ROBERT DAWSON RUDOLF, C.B.E., M.D. Edin., F.R.C.P., Professor of Therapeutics in the University of Toronto; Clinician, Toronto General Hospital; Consulting Physician, Victoria Hospital for Sick Children, Toronto. University of Toronto Press. 1923. Pp. 486. 8s.

THIS is one of the most useful books dealing with treatment that have appeared during recent years. The reader who expects to find ready-made prescriptions for every condition will be disappointed, and here we feel that Prof. Rudolf has shown commendable discretion, for it is precisely those lists of prescriptions that form the danger of the majority of such text-books; they lead to carelessness and empiricism. In the present work the reader will find existing therapeutic methods and remedies briefly described, and usually with that critical outlook which marks the scientific observer. Such procedures as the production of artificial pneumothorax and duodenal alimentation are written of in sufficient detail to allow the practitioner to employ them without reference to larger text-books. We are interested to note that the author is lukewarm in his opinion of the surgical treatment of Graves's disease, and that he considers serum therapy of little use in the treatment of chronic bacillary dysentery. Several misprints, such as "construction" for "constriction" on p. 280, require correction, but are not sufficiently numerous seriously to affect the pleasure with which this book will be read.

ORAL HYGIENE.

By J. SIM WALLACE, D.Sc., M.D., L.D.S., Lecturer on Preventive Dentistry, King's College Hospital. London: Baillière, Tindall and Cox. 1923. Pp. 76. 5s.

THE teachings of Dr. Sim Wallace on the ætiology and prevention of dental caries are by now a familiar story and have become incorporated to a considerable extent in the current conceptions of dental disease, often without sufficient acknowledgment to their author. It is a disadvantage that there is no authoritative account of Sim Wallace's work within the pages of one book. At present his views are scattered through a series of volumes, with much overlapping and repetition, so that it is by no means easy to gather a comprehensive idea of the various aspects of his investigations. The present volume consists of three papers which have appeared elsewhere, reprinted apparently without alteration. The book is in no sense a text-book on oral hygiene as the title might suggest, though it contains much instructive matter on the subject. The papers have little continuity though they are concerned with the ætiology and prevention of dental caries. To those who have hitherto learned Sim Wallace's views at second hand we commend this book. If they will read the first and third chapters they will find there the essence of his teaching explained in admirably clear language. We do not think the short note on vitamins and hypoplasia can be regarded as a fair commentary on the vitamins and their relation to calcification. The chapter on the progress of preventive dentistry is an interesting historical review, but it is damaged by personalities out of place in a scientific book.

HANDBOOK OF SURGERY.

By G. L. CHIENE, M.B., C.M., F.R.C.S. Edin., Surgeon, Edinburgh Royal Infirmary. Edinburgh: E. and S. Livingstone. 1923. Pp. 592. 12s. 6d.

IN his preface the author says that "this small handbook has been written with the object of providing a book for those who have not time to study the larger text-books." Many would hold the opinion that such students or practitioners are not worth catering for. The volume under review could certainly not be recommended as the sole text-book on surgery which the student should read. It is not possible in a book of this size to deal adequately with pathology, or to emphasise the principles upon which surgical treatment is based. Nevertheless, the teaching found in it is sound, as far as it goes, and, as a revision book, the student who has read the ordinary text-book may find it useful.

AMBULATORY TREATMENT OF FRACTURES AND DISEASED JOINTS.

By CAREL A. HOEFFTCKE. With an Introduction by FRANK ROMER, M.R.C.S., L.R.C.P., and Articles by Many Eminent Surgeons and Physicians. London: William Heinemann (Medical Books), Ltd. 1923. Pp. 274. 17s. 6d.

THIS treatise is written to show the utility of the author's ambulatory extension splints, which have been applied for some 20 years in this country for diseases of the joints and fractures; and the value of the apparatus is proved by the fact that in medical literature, both in treatises and in journals, the merits of these splints have been recognised freely. Further, although Mr. Hoefftcke does not write as a medical man but as a skilled adjuvant to medicine, his treatise is prefaced by introductory communications from medical practitioners, styled eminent in the title, many of whom are justly well known. Mr. Frank Romer, in an introduction, states clearly that he has "recently had the opportunity of seeing patients with diseased joints who have been enabled to lead an active life using the affected joint freely by means of this (Hoefftcke splint) ingenious contrivance." And in our own columns Sir Arbuthnot Lane has written: "The advantages afforded by the forcible separation of the diseased articular surfaces from one another, combined with free movement, are best shown by the use of a really efficient extension apparatus for the leg which does not interfere with the functioning of the diseased joint"—the reference being to the same apparatus.

The principles involved in the construction of various forms of ambulatory apparatus devised by the author, as well as the methods of their application, are fully set out and clearly illustrated in the early chapters of the book, while an historical survey explains the steps by which valuable, and for the most part new, types of splint were arrived at. The main objects aimed at have been to take the weight of the body off the affected limb and produce extension between the articular surfaces in joint disease, while in fractures the intention is to keep the fragments in apposition and to prevent shortening of the limb. Mr. Hoefftcke produces manifold and mutually confirming examples of cases where these objects have been achieved without confining the patient to bed; and the general well-being which is produced by such patients being able to enjoy a natural environment cannot be exaggerated. It is not only that the more free circulation of blood to the site of injury promotes

local improvement, and this rapidly in many cases, but the system of the patient is more adequately strung up so that any improvements secured get full chance of development. In the book will be found numerous ingenious contrivances, fully figured and fully explained, which will assist the medical man to treat patients for numerous conditions from a patella wrench to a diseased hip-joint; while far the greater part of the contents consists of reprints from medical journals or of communications to the author written by practitioners and patients who have had good reason to be pleased with the application of his splints, or with the use of an ingenious extension table to be employed in the manipulation of diseased joints under anæsthesia. The majority of these tributes—which are, by the way, not systematically arranged—include photographs and radiograms of patients before and after treatment, thus conveying different messages of encouragement.

The book is very well written, but in future issues it might be well for the author to note that he has quoted the same words from a well-known surgeon on pages xi. and 84 and 129. All the tributes from the medical profession are not of equal value, but it would be captious to blame Mr. Hoefftcke for recording evidences of professional support which he has received. For throughout the book he writes as a skilled craftsman, leaving the medical profession to record their views of certain of his results. And it should be stated clearly that he works only with the medical profession, and not as one who offers a substitute for medical services.

PHARMACOLOGY AND THERAPEUTICS.

Handbook of Pharmacology, including Materia Medica. By BIRENDRA NATH GHOSH, F.R.F.P.S. Glasg., Examiner in Pharmacology, University of Calcutta. Calcutta: Hilton and Co. 1923. Pp. 396.

OUR text-books on pharmacology have improved in recent years, showing themselves, on the one hand, to be books of applied physiology, and on the other to be the parents of books on treatment. In fact, they have become more rational in their methods, and one result of this change is that it has become increasingly difficult to find a place in them for mere lists and types of preparations and for doses. These the student must know, even though they have to be learnt by heart. However much the examiner is pleased to find that a student has an intelligent idea of the action of mercury, he still rejects him if he gives a poisonous dose of the perchloride or if he cannot prescribe it in a practical manner. The books of writers like Poulsson and A. J. Clark, which centre round drug actions, are a great improvement on the older pharmacologies where the drug and not the action is paramount, but such books are not sufficient for the student. He wants something in addition. B. N. Ghosh's "Pharmacology," which seems really to be an abbreviated form of R. Ghosh's "Materia Medica and Therapeutics," affords the bare facts and lists which it is difficult to pick out in the other books named, a difficulty all the greater now it is customary to give preparations of the U.S.P. as well as of the B.P. This book cannot stand alone, as it does not make the student think, but it is useful as it supplies in assimilable form the concentrated facts which have to be learnt before a man can practise successfully or even safely.

Indian Therapeutics. By D. V. SANDU. Bombay: V. K. Sandu. 1923. Pp. 90 and Supplement.

SCHOOLS of treatment are out of fashion. None has shown itself to be absolutely right; few do not contain some glimmering of truth; all get left behind in the light of scientific research. But the Ayurved or Aryan medical science survives long, and this booklet, by one of the Sandu brothers, who have works for the manufacture of the drugs of this system, lays before English readers the history and merits of the system. The explanatory introduction is of interest, but to the uninitiated the list of drugs with long Indian names and of diseases treated is reminiscent of the herbalist or the quack. "The action of medicines mostly depends upon the belief of the patient in the prescriber and the medicine prescribed. Atmost (*sic*) care should therefore be taken to create confidence and hope in him." These are sentences which show candour, and their sentiment is one in which many English physicians will agree. But in all the material of Indian galenicals there must be something of value, and it remains for pharmacologists and perhaps for the Ayurvedic system to bring it to light. Interest is added to the book by the recent Madras report on native Indian schools, in which the Ayurved school is thoroughly considered.[1]

ECHOES.

By Sir DONALD MACALISTER, K.C.B. Glasgow: Maclehose, Jackson and Co. 1923. Pp. 212. 7*s.* 6*d.*

THIS volume is a reissue of the translations from and into various languages, which from time to time and in different places have appeared from Sir Donald MacAlister's pen. There can be few scholars with such a range of tongues, and not one alive whose learning and literary skill would enable him to translate not only Spanish, Italian, and Russian into English, and Greek and German into Russian, but Provence into Scots, Oliver Wendell Holmes and Robert Louis Stevenson into German, and quatrains of Omar Khayyám and songs of Walter Scott and Calverley into Welsh Rómani. Further, there are translations which are renderings, but not echoes; but Sir Donald MacAlister has well named this collection, for in those cases where the reviewer can apply any personal knowledge—a lamentably meagre range in proportion to the opportunity offered—both the spirit and the lilt of the original have been maintained. Let anyone, without knowing a word of gypsy language, read aloud the chorus of Kipling's "Smuggler's Song" in English, and then the version in Welsh Rómani, and appreciate Sir Donald MacAlister's skill and literary sympathy. He will also be sadly envious of the opportunities for enjoyment which learning has given to the President of the General Medical Council, whose serious business in life the New Year's list of honours celebrates this week.

HYGIENE OF THE VOICE.

By IRVING WILSON VOORHEES, M.S. Princetown, M.D. Columbia. New York: Macmillan Company. 1923. Pp. 212. 12*s.*

THIS little book is divided into two parts, the first intended for the general reader, teacher, or pupil, and written in non-technical language, and the second part intended for physicians or those possessing medical knowledge; but this latter part is not very technical, and is apparently intended for laymen with some medical knowledge quite as much as for physicians. The book is brightly and even humorously written, but is not quite dogmatic enough for the practical pupil; it advises him not to work the voice when he has a cold, but gives no decided opinion on such unsettled questions as the age at which teaching should begin or the use of the vocal registers. The author rightly advocates with enthusiasm a more cordial understanding between teachers of singing and laryngologists. The best chapter is that in the second part on the "tonsil question"; he sent out a questionnaire to 500 physicians and 500 teachers, and concludes that impairment of the voice after tonsillectomy is possible, but very rare; while most cases show an increased range of tone, he decides that abnormally large or diseased tonsils should be completely removed by dissection.

The author pays a high tribute to the work of Sir Morell Mackenzie.

[1] THE LANCET, Sept. 29th, 659, 669.

The Conduct of Medical Practice.

A Series of Articles by Experts dealing with the Difficulties Encountered in Professional Life and How to Meet Them.

I.—ASSESSMENT FOR INCOME-TAX: ACCOUNT-KEEPING.

BY W. R. FAIRBROTHER, F.S.S.,
ACCOUNTANT AND INCOME-TAX SPECIALIST.

There was no reckoning made with them of the money which was delivered into their hand; for they dealt faithfully.—II. Kings xxii. 7.

THE completion of his annual taxation return is not a task the average medical man enters upon with gusto; rather does he feel that the ordeal, although not enjoyable, is yet inevitable. Doctors are not much given to a fondness for strict account-keeping, and in all too many cases the Income-tax return, whilst reflecting the receipts fairly accurately, does not as accurately allow for the expenses. The result, of course, is that a needless addition is made to the already heavy burden of taxation which must be borne. Moreover, apart from taxation, it is surely necessary that any professional man should know, at the end of the year, what his net profit amounts to. Not only does this enable him to gauge his financial position, but it affords the evidence of value of the practice required in the event of sale, death, or change of partners.

Having diagnosed the complaint it becomes necessary to prescribe the remedy, which is of a three-fold character—viz., a proper but simple form of account-keeping, the correct manner of computing the Income-tax assessment, and an explanation of the deductions, allowances, and reliefs which may be claimed.

The accounts may conveniently be divided into the correct recording of receipts and payments.

Receipts.—A Call-book or Diary will be kept giving sufficient details in the case of credit cases for a statement to be prepared later. This book would be in the form shown in Table I. It will be observed that one Cash column provides for cash paid at the time and the other for credit bookings. The Credit column must be posted in detail to a ledger, while the Cash

TABLE I.—CALL-BOOK OR DIARY.
January, 1923.

Day of week and month.	Name (and address if new patient).	Details of treatment, or drugs supplied.	Settled by ready cash.		"Bookings" not paid (post to ledger). Fol.	Amount.		
Mon. 1	Allinson, R. H., Esq.	Massage—liniment, 3s. 6d.; ointment, 1s. ..			24	2	6	6
,,	White, Miss E. A.	Medicine as before		3				
		C.B.1 ..		3				
Tues. 2	Brown, Miss B. (maid to Lady Morton; charge to her a/c).	Attended cut hand—bandage and ointment n/c.			7		3	6
Wed. 3	Wilson, Mrs.	Attended on round			82		5	
,,	Thackery, Master.	Attended on round			84		5	
,,	Thomas.	Attended on round		5				
,,	Smith.	Examination	1	1				
		C.B.1 ..	1	6				

(" Bookings " column totalled through to end of year.)

TABLE II.—CASH BOOK.

Dr. CASH RECEIVED.

Date.	Name or details.	—	Cash. £	s.	d.	Bank. £	s.	d.	Ledger a/cs. Recd. Fol.	Amount. £	s.	d.	Cash takings.	Insurance Commissioners.	Private cash introduced.	Interest received.
1923.																
Jan. 1	To Balances	b/fwd.	3			350										
,, 1	,, Cash takings per	D/1	3										3			
,, 1	,, A/cs. reed.: Lloyd		3	3					34	3	3					
	Pullinger			10	6				5		10	6				
	Meredith		2	19	6				18	2	19	6				
,, 2	,, Cash takings per	D/1	1	6									1	6		
,, 3	,, do. do.	,,	10										10			
,, 3	,, A/cs. reed.: Allinson		12	6	6				24	12	6	6				
,, 5	,, Cash banked					30	8	6								
,, 5	,, Cheque for wages, &c.		10													
,, 5	,, Rent reed. (wife's property) ..		5												5	
,, 31	,, Insce. Commrs. (Nov.)		40											40		
,, 31	,, Banked					45										
		£	88	8	6	425	8	6								
Apl. 1	To Balance	b/d.	2		9	289	13	4								
,, 1	,, Interest on deposit, per pass book ..					1	2	6								1 2 6
,, 15	,, Cheque repaid to bank	•				2										
		£	2		9	292	15	10								
	Analysis columns added through to totals at end of year ..									£	18	19 6	11	9	40	5 1 2 6
1924. Jan. 1	To Balances	b/d.	2		9	290	15	10								

column is totalled and entered daily on the receipt side of the cash book. No payments for *past* services are to be shown in the call-book, but such payments are entered at once on the receipt side of the cash book and posted to the appropriate ledger account. The cash book is as shown in Table II.

The receipt side of the cash book should have two cash columns, one headed Cash and the other Bank. Care should be taken that receipts are banked in full and cheques drawn for cash required for payments. When money is banked the Cash column should show clearly the details of the amount, which amount is entered in the Bank column. The Cash column will contain daily totals from the Call-book Cash column, amounts received from credit patients, local authorities, hospitals, Insurance Commissioners, &c. An analysis cash book is advocated in which columns are provided for the extension of the amounts received under the various heads given above, so that a yearly total can be obtained of the receipts from the different sources. Where the banking account is used for private as well as business purposes, dividends, rents, or other private receipts should be entered in the cash book (either in detail or without detail if it is desired not to disclose the detail in the business books) in order that the cash book can be balanced with the pass book. The Analysis columns on both sides of the cash book should be totalled continuously to the end of the year in order to give the figures for the final account.

Payments.—Cheque payments must be distinguished from cash payments by being entered in the Bank column side of the cash book, while cash payments are entered in the Cash column only. Cheques drawn for cash are entered in the Bank column on the payment side and in the Cash column on the receipt side. Both cheque and cash payments will be extended in the Analysis columns. Private payments or cheques to self for private purposes should be extended under the head of "Drawings." Care should be taken to distinguish between capital and expenditure payments. Additions to the previous stock of instruments should be distinguished from replacements, and additions to the consulting-room or surgery furniture from repairs and renewals. Sufficient detail of the payment should be entered—e.g., on entering a payment for gas the quarter year it relates to should be given. Petty expenses, such as postage and fares, may conveniently be dealt with by way of a petty cash book, the cash book being credited and the petty cash book debited with the round amounts allowed for petty cash.

The following is the procedure in case of a cheque being returned by the bank, and later repaid into the bank. On being returned by the bank, it should be entered as a payment in the Bank column and on

TABLE III.—FINAL ACCOUNT.

Year Ended 5th April, 1923.

RECEIPTS.		PAYMENTS.	
To Practice fees	400	By Rent	50
,, Insurance Commissioners	700	,, Rates and water	35
,, Asylum Board	50	,, Repairs	11
,, Wayward Corporation	500	,, Insurance	2
		,, Drugs, instruments and bottles	56
		,, Lighting and heating	20
		,, Postage, stationery, and telephone	33
		,, Periodicals and text-books	15
		,, Wages and N.H. insurance (including board)	55
		,, Car-running expenses (or hire)	80
		,, Locum tenens (including board)	50
		,, Accountancy	10
		,, Balance	1233
	£1650		£1650

TABLE II.—CASH BOOK (*continued*).

CASH PAID. Cr.

Date.	Name or details.	Voucher No.	CASH.	BANK.	Drugs and instruments (small renewals only).	Rent, rates, taxes, and reps. to premises.	Gas and electric light.	Salaries.	Personal drawings.†	Capital expenditure.	Petty cash.	Sundries.
1923.												
Jan. 1	By Rent, Xmas qtr., less tax	1		14 2 6		14 2 6						
,, 4	,, Electric light do.	2		3 12 8			3 12 8					
,, 4	,, Gas do.	3		4			4					
,, 4	,, Burroughs, Wellcome	4		24	24					F.A.C.		
,, 4	,, Maw, Son, and Sons	5		50	30					20		
,, 5	,, Cash for wages, &c.	—		10								
,, 5	,, Wages: Chauffeur, &c.	—	3					3				
	Dispenser and boy	—	5 12 6					5 12 6				
	Carter Paterson a/c.	6	8 9		C. 8 9							
	Fares	—	18									18
	Petty cash	—	1								1	
,, 5	,, Cash banked	—	30 8 6									
,, 31	,, do.	—	45									
,, 31	,, Self			30					30			
Mar. 31	,, Balances	c/d	2	9 289 13 4								
			£88 8 6	425 8 6								
Apl. 13	By Cheque returned	*		2								
Dec. 31	,, Balances	c/d	2	9 290 15 10								
			£ 2	9 292 15 10								
					£54 8 9	14 2 6	7 12 8	8 12 6	30	20	1	18

C = Carriage. F.A.C. = First Aid Cabinet. † A column headed "Printing, Stationery, &c." could be inserted next to "Personal Drawings."

being paid in again it should be entered on the receipt side of the cash book in the Bank column. It may be starred on both sides, as shown, to indicate that it need not be posted to the ledger. Cheque books and interest charged by the bank direct through the pass book should be entered in the Bank column on the payment side.

Final Accounts.—With a view to agreeing the final accounts for the year it is desirable that all casts and cross casts throughout the year should be checked from time to time. In preparing a total receipts and payments account for the year all additions to instruments, fixtures, &c., and all drawings must be excluded on the payment side, while on the receipt side private monies must also be excluded. The figures should also be agreed in total and for this purpose the starting bank and cash balances must be added to the receipts and the closing bank and cash balances to the payments. In order that a proper amount may be allowed for depreciation, it is desirable to have an inventory of the business fixtures, fittings, and instruments. The fire insurance inventory will often be a useful guide.

Audit.—Whether it is decided to have an audit or not it is well to have the receipts or vouchers in good order. This is easily effected by numbering the payments in the cash book consecutively. When the receipts come in they should be attached to the statement and numbered with a large number corresponding to the number in the cash book. It will be appreciated that No. 312 may come in before No. 305, but if every receipt is numbered clearly they can later be readily sorted into numerical order.

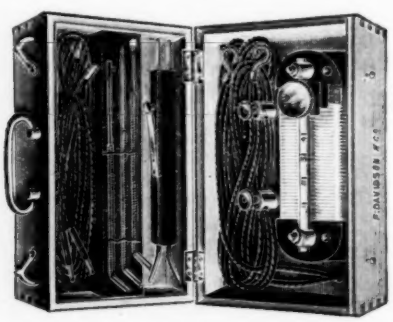
The final accounts could appear in the form shown in Table III.

In a succeeding article the Income-tax assessment, deductions, allowances, and reliefs will be explained, apart from the manner in which the accounts have been kept, so long as figures are ascertainable showing amount of profit.

New Inventions.

AN IMPROVED CAUTERY.

THE accompanying illustration shows an apparatus which has been designed for cautery work, and consists of a rheostat, handle, cords, terminals, and three heavy platinum burners. The source of electric



supply is the accumulator of a motor-car; the accumulator is, of course, continually charged by the dynamo. The cords attached to the rheostat are hooked to any accumulator from 4 to 12 volts. If more than one separate accumulator is fitted to a motor-car, one could be lifted out of its box after disconnecting and used with the outfit.

Mr. Davidson, of 29, Great Portland-street, W., has made the instrument for me.

CHARLES S. THOMSON, M.D., D.P.H.,
Medical Officer of Health, Deptford.

Reports and Analytical Records.

BICREOL BRAND BISMUTH CREAM.

(BURROUGHS WELLCOME AND CO., SNOW HILL BUILDINGS, LONDON, E.C. 1.)

THE employment of bismuth in venereal disease has been on trial for a number of years, and considerable experience has been put on record as to the influence exerted by trépol and neo-trépol upon syphilitic symptoms. In Bicreol Messrs. Burroughs and Wellcome supply the medical profession with a cream which consists of pure metallic bismuth in an extremely fine state of subdivision incorporated in a creocamph basis, each c.cm. containing 0·15 g. of the active element. Considerable interest is to-day focused upon bismuth as an anti-syphilitic agent, the metal having been reported successful in cases which had previously resisted mercury and arsenic, the attendant disadvantages being comparatively slight. In the English edition of Prof. Poulsson's Pharmacology, edited by Prof. W. E. Dixon, only a mild form of stomatitis is alluded to as a possible inconvenience.

FIVE NEW PREPARATIONS.

(1) IODO-BISMUTHATE OF QUININE (FRAISSE). (2) SÉRUM NÉVROSTHENIQUE (FRAISSE). (3) SÉRUM FERRUGINEUX (FRAISSE). (4) NATIVELLE'S TABLETS QUINIDINE SULPHATE. (5) SIROP FAMEL.

(MESSRS. WILCOX, JOZEAU AND CO., 15, GREAT ST. ANDREW-STREET, W.C. 2.)

WE have received from this well-known firm of foreign chemists specimens of five of the latest preparations which they have placed on the market, the first three being from the laboratories of M. Marius Fraisse and Co., 8 Rue Jasmin, Paris, the fourth from the Laboratoire Nativelle, 49, Boulevard de Port Royal, Paris, and the last from the laboratory of M. P. Famel, 20 and 22, Rue des Orteaux, Paris. (1) Quinine-iodo-bismuthate ampoules (Fraisse). These spirillicide ampoules, which are supplied with the proper syringe where required, and with full instructions as to dosage and administration, would enable a systematic course of the drug to be taken with safety. Each ampoule contains quinine-iodo-bismuthate, 3 gr. to 4 c.cm. of olive oil. (2) Sérum Névrosthenique ampoules (Fraisse). This preparation is a combination of strychnine and phosphorus for employment in neurotic conditions, under the prescription of a medical practitioner. Each ampoule contains 0·0005 g. strychnine cacodylate and 0·1 g. sodium glycophosphate per cubic centimetre of liquid, so that an adult may receive daily an injection of 1 c.cm.—that is to say, the contents of an ampoule. (3) Ferrugineux ampoules (Fraisse). The formula of these ampoules, which have been designed for the intensive treatment of anæmia, is as follows: Cacodylate of iron, 0·01 (1/6 gr.); cacodylate of strychnine, 0·0005 g. (1/120 gr.); and sodium glycero-phosphate, 0·1 g. (1½ gr.). The method of employment recommended is 1 ampoule daily for ten days to a fortnight, an interval of five or six days being allowed to elapse if it is necessary to recommence the treatment. (4) Quinidine sulphate tablets (Nativelle). These tablets are supplied under the name of quinicardine, in sealed tubes, at the price of 6 francs each tube, containing 20 tablets, all care having been exercised to render the drug absolutely pure. (5) Sirop Famel. This is a well-known remedy for giving relief to patients suffering from bronchial irritation and catarrhal respiratory conditions. It would appeal to medical men as a more valuable remedy if the claim set out with it were not so all-embracing, but there is considerable clinical experience in France to the effect that the sirop is a well-tolerated preparation of creosote. The creosote in the sirop is associated with codeine and aconite, so that the preparation ought not to be taken without medical advice or in doses larger than those indicated in the directions.

THE LANCET.

LONDON: SATURDAY, JANUARY 5, 1924.

SIR DONALD MACALISTER.

WE are speaking for the whole of the medical profession in offering warm congratulations to Sir DONALD MACALISTER, President of the General Medical Council, upon the honour of a baronetcy which he received this New Year's day. In the case of so well-known a man there is no need to detail the events of a career which from boyhood at Aberdeen, through Cambridge, Oxford, London, and Glasgow, has been marked by the highest academic prizes attainable. Balliol scholar at Oxford, and Senior Wrangler at Cambridge, President of the General Medical Council and of the Gypsy Lore Society; finished scholar in half a dozen modern languages; first Croonian Professor of the Royal College of Physicians of London and Principal of the University of Glasgow—such are sufficient indications of the wide range over which Sir DONALD MACALISTER has been able, in a life of extraordinary intellectual fullness, to use his mind aptly and his judgment wisely, shrewdly, and impartially.

In this place we refer only to Sir DONALD MACALISTER'S work as President of the General Medical Council, regarding his labours here as the outstanding achievement of his career. He became President of the Council in 1904 in succession to Sir WILLIAM TURNER, having previously been a Member of the body for five years as the representative of the University of Cambridge. At his election as President there were many members of the Council of far longer standing, some of whom were at that time more widely known in the purely medical world; but in the Council MACALISTER had made his mark from the beginning, especially by resolute watchfulness over the educational curriculum as conducted by various of the statutory bodies. His motions in respect to the irregularity of the conduct of examinations at the Apothecaries' Hall, Dublin, to the low standard of the early tests at the Society of Apothecaries of London, and to the impractical character of the final tests at the University of Oxford led to his appointment to represent the Council at a conference with the Board of Education, as well as to a general stiffening of the procedure at the visitation by the Council of the various examining centres. Further he became Chairman of the Pharmacopœia Committee, and thus along two of the main divisions of the work of the Council revealed himself as a leader, a reformer, and a reasonable man. So when he was elected President of the Council there was satisfaction within the body, and this was widely reflected among medical men without, who had reason to feel that the Council required, in view of increasing educational and social developments, a man equipped to deal firmly with large things, while equally able to see that in details the course taken must be correct.

These expectations have been fulfilled, and a review of the extended work done by the Council during Sir DONALD MACALISTER'S long period of authority would prove this entirely, as would any synopsis of his individual share in the proceedings. Throughout his whole term of office the Council has steadily increased in public esteem and in public utility; foolish bickerings and personalities have ceased; the finances, once sorely depleted by the needless protraction of the sessions, have been placed on a sure footing; subcommittees, wisely chosen, have rendered reports in advance on all the main headings of the work, with the result that the discussions by the main body have been coherent and well-directed. The voice of the Council, where medicine is concerned in the conduct of public affairs, is now received with respect in the transaction of national business, while the good men whom the President has led during the past 18 years would be prompt to allow that their virtues have had full opportunity under his guidance.

BACTERIAL FOOD CONTAMINATION.

A SYSTEM which depends on a sequence of slow extensions and developments instead of on the sudden application of a thought-out and comprehensive code is liable to present surprising lacunæ. Such a system we see in our laws and enactments relating to public health, and one of the most obvious of the lacunæ is in regard to the protection of certain of our food-supplies from bacterial pollution. In some directions the safeguards are very efficient, in others they are inadequate or non-existent. Dr. C. E. GODDARD [1] has recently drawn attention to the dangers of bacterial contamination from the sale of bread delivered without wrappers, of fruit—grapes, dates, and others—without any protection, while the numerous articles in grocers' shops which attract flies and which are not protected from them form other risks, the same being said of the fingering of meat in butchers' shops. As medical officer of health for the Wembley area, which includes the British Empire Exhibition 1924, Dr. GODDARD will be brought in contact with food problems of great importance. While many such sources of food pollution might be cited it is perhaps easy to exaggerate their significance in respect of public health. They form serious defects in our methods of food distribution, but of considerably greater importance is the absence of adequate control over the preparation and of subsequent care in respect of what may be called "prepared meat foods" and the lack of supervision over those who handle foods destined for consumption by the public.

A study of outbreaks of food poisoning shows that a material proportion, indeed, a majority, of such outbreaks are due to specific contamination of made-up meat foods—sausages, brawn, meat pies, and the like. There is, however, no special supervision authorised in any of our public health laws either for the premises where these are prepared or for the care of these products. The clauses in the different Acts dealing generally with food allow for inspection and seizure of foodstuffs found unfit for consumption, but such regulations do not go far enough, and there is nothing to prevent preparation under manifestly unsatisfactory conditions. These comestibles need *special* supervision and this they do not receive. It is not uncommon for such made-up foods to be prepared in or immediately adjacent to the slaughter-house and for the workers in the latter to take part in the preparation of the foods. At the City of Liverpool special powers have been obtained to control the premises

[1] Journal of State Medicine, December, 1923, xxxi., 585.

we are considering, but such enlightened authorities are very few in number. It is not the large scale manufacturers for whom such supervision is required, for here nearly all concerned are alive, if only for the preservation of their own good name, to the importance of cleanliness. The risk mainly operates for the small businesses carried on by two or three people, ramifying often into several branches concerned in slaughtering, in food preparing, and in sale over the counter. These businesses are inadequately controlled, and it is here that an immunity from accident fosters a disregard for dangers of which lack of education as to food contamination precludes any grasp.

The importance of supervision over those who handle food destined for consumption in public places is better recognised in the United States than in this country, and in New York, Kansas City,[2] and other places which might be enumerated, special examinations of these "food handlers," as they are called, are undertaken and special ordinances are promulgated for their supervision and control. The considerable number of such persons found to be suffering from syphilis, tuberculosis, and other communicable diseases is disquieting, and at the same time furnishes abundant justification for such examinations. The Health Commissioner of Kansas is endeavouring to institute a mental test for food handlers which will necessitate study of elementary sanitary principles. In this country but little has been attempted along these lines. Quite recently the case of a man suffering from advanced tuberculosis while continuing to deliver milk and otherwise take part in the duties of a purveyor of milk aroused some comment in the public press. It was not at all an isolated case and the authorities are in no way authorised to stop such a practice—as far as Acts of Parliament go they are powerless.

With such a series of ways in which disease can be conveyed by contaminated food it is desirable and important to seek for guiding principles as to the lines which should be followed if adequate protection is to be ensured. Two such principles are indicated by the facts of the situation. In the first place, with our elaborate system of public health officials the public have a right to assume that those who minister to their wants in public places where food is supplied are healthy or, at least, not likely to contaminate with harmful bacteria the food they serve. In the next place available scientific knowledge shows that it is imperative that all made-up foods which are composed of substances which favour bacterial growth should be adequately controlled and supervised so that these dangers may be minimised. This is especially necessary when such food is sold cooked and is therefore eaten without the safeguard of additional cooking. These goods are nutrient media for bacteria and the importance of the fact that there is no subsequent cooking is frequently lost sight of or unappreciated. Comparing bread and brawn, both receive no subsequent cooking, but with bread the risk of disease conveyance owing to the food being unwrapped is comparatively slight though the dirtiness implied is revolting. But with such a substance as brawn bacterial contamination is a danger because of the facility for bacterial multiplication after chance contamination and before consumption. A better protection of all food articles exposed to sale is desirable, as Dr. GODDARD wisely points out, and the prime needs are for control over those who handle food supplied in public places to be eaten without further cooking and in particular an extension of the present inadequate control over all places where made-up foods are prepared which are suitable bacterial media and which are eaten without further cooking.

[2] See THE LANCET, 1922, ii., 679, and 1923, i., 778.

CHOOSING A PROFESSION.

WE have never far to look for an example of a square peg in a round hole—a fellow-being who has missed his vocation in life. The war jerked many square pegs out of round holes, and sometimes found square holes for these pegs, but the process was seldom more than a blind shuffle. Some, perhaps many, of the misfits we see about us could have been avoided had the persons concerned had the benefit of expert medical advice at the outset of their careers. Without it, they have remained in their ill-adjustment, striving against it, what time their friends have hammered hopefully on the square peg, trusting that it would become round or that the hole would become square in the process. A very remarkable book[1] has been published by the oculist Prof. H. LAUBER, who has chosen as his collaborators 11 eminent specialists with wide experience of the misfits in life in their various specialties. Prof. LAUBER had hoped to induce the Austrian Ministry of Health to take up this work, but the fact that it has had to be carried out as an independent undertaking may have added to, rather than detracted from, its usefulness. From time to time the daily papers contain correspondence with the heading: "What Shall We Do with Our Boys?" But it has seldom been suggested that, before an answer to this question is attempted, a boy should be given a searching examination of body and mind by a medical expert or, better still, several medical experts. There is something ironical in the fact that at the present time medical examinations for certain services, such as the army and navy, are, at any rate partly, intended for the rejection of unsuitable applicants. Might not medical examinations of our fellow-beings on the threshold of life fulfil a higher purpose if their chief aim was to find out the qualifications, rather than the disqualifications, of the individual for a certain vocation or profession? Merely to pick out the "A-ones" for certain duties and to leave the remainder to fend for themselves is assuredly a policy as short-sighted as it is callous. This policy may, perhaps, appeal to a certain class of employer, but with the progress of civilisation we are learning to think in terms of the employees.

As an oculist, Prof. LAUBER has had exceptional opportunities for observing the tragedies which an unwise choice of profession brings in its wake, and he refers to the case of a cavalry officer whose high degree of hypermetropic astigmatism greatly impaired his efficiency. As a prospective cadet he had been rejected on account of his eyesight, but his father, who had influence in high quarters, got his son into the cavalry through a back door. There he was a square peg in a round hole, with no one but himself and his father to thank for his unhappy fate. Even this extreme example can be paralleled in this country and not seldom, while less obvious unsuitability for the selected career strikes the eye daily. But in the advice as to the choice of a profession the medical examiner must look far ahead; a candidate may be qualified to fill a post satisfactorily at the present, but will he be equally qualified a decade or two hence, when it is too late to change

[1] Handbuch der ärztlichen Berufsberatung. Edited by Prof. H. Lauber. Vienna: Urban and Schwarzenberg. 1923. Pp. 586. Swiss francs 18.75.

to another profession? A waiter with progressive myopia may for some time be able to carry out his duties satisfactorily without glasses—somebody else can make the pun for us—but when the time comes that spectacles are indispensable he must cease, it appears, to be a waiter. We are assuming that a waiter may never, or almost never, wear glasses, because a waiter so reinforced is as rare as, say, a High Church clergyman with a moustache. A generation ago the family doctor was often called on to advise in the choice of a profession for the son of the house, and the advice given was often sound. But with the development of the school medical service it is the school medical officer, rather than the family doctor, who will play the most important part in this matter as far as the working classes are concerned; and Prof. LAUBER anticipates the time when the school medical service will be so organised that the scholar when he leaves school will have his qualifications and disqualifications carefully analysed and classified. It is not, of course, Prof. LAUBER's intention to rob the parents or their children of their freedom of choice; what he proposes to supply them with are scientific data on which they can base their choice of a profession.

In a chapter on Character Defects in the Young, one of Prof. LAUBER's collaborators, Dr. ERWIN LAZAR, draws attention to the special qualifications of the hyperthymic[2] person whose bright and cheerful temperament is most suited to busy surroundings and free intercourse with strangers. The hyperthymic individual is suitable for employment in public-houses, the barber's shop, and trade generally. But he is not suitable for occupations requiring conscientious and persistent effort, nor is he fit to work alone and not under observation. The antithesis to this type is the depressive, intolerant, morose person who does not love companionship, preferring his own company. To give him the occupation suitable for a hyperthymic person is to court disaster, whereas he is comparatively well qualified to work independently and alone. Several of Prof. LAUBER's collaborators have tabulated their information for ready reference, lists being given of various occupations and the qualifications and disqualifications therefor. Lists are also published of the disqualifications and defects most likely to give trouble in certain occupations, and to give an illustration of the thoroughness with which this work is done we would refer to a table in which Prof. GUSTAV ALEXANDER classifies the occupations unsuitable for anyone with abnormal labyrinthine functions. About 50 occupations are mentioned, and not only the acrobat and aviator, but also the chauffeur, house decorator, and jockey are mentioned in this list. The qualifications and disqualifications of a doctor are discussed by more than one of Prof. LAUBER's collaborators, and conditions regarded as disqualifications for the practice of medicine include chronic catarrh of the respiratory passages, perforation of the septum of the nose, ozæna, psoriasis of the nails, eczema, syphilis, idiosyncrasy to mercury, degenerative defects, psychoses, and much else. History is full of records of successes achieved by square pegs in round holes, and we need only cite the case of NELSON, who was always sea-sick in rough weather, to stress the fact that apparently serious obstacles to success in a profession may be overcome. But these are exceptions proving the rule, and we should do well to fit our offspring into the mosaic of life with even greater care than we fit a piece of painted wood into a jig-saw puzzle.

[2] From θῦμός the principle of life, not θύμος the gland.

RESEARCH AND THE PRIVATE PATIENT.

IN a book dealing with the metabolism of diabetic patients[1] E. P. JOSLIN pays tribute to the great assistance he has received from the patients themselves in the course of his investigations. "The patients considered themselves united in a partnership, having for its object the accumulation of knowledge for the benefit of all diabetics rather than for the given individual under investigation in particular," he writes, and this happy experience has been shared by many whose work has brought them in touch with the modern treatment of diabetes. Its gravity and the importance of meticulous attention to details of dietary make this disease peculiar in that the close coöperation of the patient is essential for successful treatment; but the benefit to medical science which results from such coöperation might, we feel, be extended by a much wider application of such coöperation in the case of sufferers from many serious diseases. The last century saw a tremendous growth of medical knowledge resulting, on the clinical side, from the careful observation of large numbers of cases. Our knowledge of the clinical aspects of nephritis, as an example, is largely the result of the generous action of the colleagues of RICHARD BRIGHT, who placed a whole ward at his disposal to enable him to make close study of this malady. To-day, both on the clinical and the laboratory side, there is need of more detailed study of individual cases, sometimes over very long periods.

It is here that the private patient may be of such special utility. Physicians and surgeons attached to the great general hospitals are constantly confronted with the difficulty of tracing the end-results of treatment; the most elaborate "follow-up" systems fail to trace an appreciable percentage of cases; the illiteracy, the indifference, and often the stupidity of that floating population which is treated in these institutions are a formidable bar to progress. Private patients, on the other hand, can usually be traced with ease; they are accessible over long periods, and their superior education renders them much readier to supply that information which is often of vital importance in a clinical inquiry. We have heard it urged that the confidential relations between a physician and his patient prohibit the publication of data accumulated in the course of his private practice. For such a view we can find no logical support. Clearly no doctor has the right to disclose the identity of his patient in any written account of a case, and the difficulty here is far greater with private than with public patients, but the duty is imposed just as strongly in the case of hospital patients as in that of those seen in private. But provided that this first rule of conduct be observed it remains the duty of the medical man to advance knowledge, and the publication of careful clinical and laboratory observations remains the most important road for such advance.

A further benefit accruing from coöperation with the patient is the educative effect of such combination. A large part of the public remains in deep ignorance of the importance of research, and the veil of this ignorance is most surely lifted by personal experience of the methods and aims of our profession. Knowledge of the purport of laboratory investigations gives the patient an entirely new sympathy towards such work, and the laboratory worker who is able to investigate an intelligent patient over a long period is in a position to obtain results of far greater utility than is the case when a single observation is all that is permitted to him.

[1] E. P. Joslin: Diabetic Metabolism with High and Low Diets. The Carnegie Institution, Washington, 1923.

Annotations.

"Ne quid nimis."

THE NEW YEAR HONOURS.

THE list of New Year honours, although short, includes the names of 14 members of the medical profession. Sir Donald MacAlister becomes a baronet. Among those upon whom knighthood is conferred are Dr. Henry William Russell Bencraft, of Southampton, well-known alike as a sound practitioner, now retired, as a sportsman, and politician; Dr. Byrom Bramwell, a great physician and teacher, recently honoured by his colleagues and friends on the occasion of his seventy-fifth birthday; and Dr. Harry George Waters, P.M.O. of the East Indian Railway. Dr. Henry Lindo Ferguson, Dean of the Faculty of Medicine, Otago University, Dr. David James Galloway, member of the executive and legislative councils of the Straits Settlements, and Lieut.-Colonel William Thomas Prout, one of the medical advisers to the Colonial Office, also become knight bachelors. In the Military Division of the Order of the Bath Lieut.-General Sir William Boog Leishman, K.C.M.G., Director-General of the Army Medical Service, becomes a knight, and Major-General Dennis Joseph Collins, C.M.G., Deputy Director-General in the Southern Command of the East Indies, and Air-Commander David Munro, C.I.E., of the Royal Air Force Medical Services, Companions of the same Order. In the Royal Victorian Order Surgeon Lieut.-Colonel Sir Warren Crooke-Lawless, C.B., C.I.E., C.B.E., is made a knight, and Dr. Alexander Hendry, Surgeon Apothecary to H.M. Household at Balmoral, is promoted from M.V.O. to C.V.O. Dr. Behari Lal Dhingra, Chief Minister of the Jind State, Punjab, receives a Companionship of the Indian Empire, and Dr. Louisa Helena Hart, medical missionary at Madanapalle, Madras, receives the Kaisar-i-Hind Medal. To all these we offer in the name of the medical profession our hearty congratulations.

A FRENCH MEDICAL COUNCIL.

THE note by our correspondent in Paris, which appeared on p. 1318 of our issue of Dec. 15th, 1923, in regard to a proposed Medical Council in France, is of much interest. It suggests the establishment in France of what at first sight might seem to be a body analogous to our own General Medical Council, but this would be a wrong idea of what is so far projected, in spite of certain similarities of design and function. It appears that local councils are to be established for dealing with conduct in a professional respect. These appear to resemble in some degree the committees of inquiry set up under the Insurance Acts in this country to deal with offences under those Acts. This will no doubt be of considerable help in checking abuses, but there is always a risk with local tribunals that personal factors may not be eliminated, and that the judicial aspect may be to some extent overlooked. It is understood, however, that in addition to this there is to be a National Medical Council sitting in Paris, of whom half are to be legal members and half members of the medical profession, with the President of the Academy of Medicine as president and member ex-officio. To this body appeals from the local tribunals can be made, and a safeguard is therefore provided against any local prejudice. The details of the working of this Council are not set forth in the note, and there is nothing to show whether there is power to summon witnesses, or to take evidence on oath. The right of appeal is set down as being in regard to charges of incompetence, exceeding of duty, or violation of the law. The first and last of these are not matters which would come before the General Medical Council of the United Kingdom. The first is a matter with which it never deals, leaving persons who feel themselves aggrieved to take what action they think well in the civil courts. The term "exceeding of duty" is not very clear, and it is difficult to say what is meant by it. Violation of the law in this country would be dealt with in the first instance by the civil courts, but the General Medical Council has the duty laid upon it of considering convictions and judging whether the gravity of the offence is such as to warrant the erasure of a name from the Register or not. There does not appear to be any provision for either the local council or the National Council to deal with offences which in this country come under the heading "infamous conduct in a professional respect," and include offences for which no civil remedy is provided. In view of the long experience of the General Medical Council and the large number of recorded judgments which appear in its publications the authorities in France might do worse than to consult the Council, and, if necessary, to ask for its observations before any new law on this subject is finally settled.

THE CONTROL OF ALCOHOL.

Dr. Arthur Shadwell has long been known as a leading student of the drink problem and more especially of the possibilities of keeping its evils within bounds by legislative measures. His writings on the subject are remarkable—one is almost tempted to say unique—because he seems really to occupy that detached and impartial position which every brewer and equally every teetotal fanatic claims as his own. He has just published a volume,[1] written originally as one of the war monographs to be issued by the Carnegie Fund for International Peace, which gives a detailed history of the controls which gradually restricted the facilities for getting drink during the war and of their partial relaxation since 1919; in an appendix of 82 pages are printed a selection of the orders and regulations which were made and a variety of statistics. The effect of these various measures cannot, of course, be stated in such objective terms, but the author has no hesitation in affirming his conviction that the police returns give in a general way a satisfactory gauge of alcoholic excess, especially where, as in the present instance, the fluctuations are so large. Whether the scale is the consumption of alcohol (which is at one end of the series of possible measures) or convictions for drunkenness (which is the other end of the series), there is no doubt that the imposition of control was followed by less drinking, and that drinking became progressively less as control was made more stringent. The consumption of beer in 1914, 1918, and 1922 was as 100, 38, and 65, of spirits as 100, 28, and 54; the convictions for drunkenness as 100, 16, and 42.

There is much of interest in the details of the statistics—the seasonal and local changes and so on—but most readers will probably prefer to treat them in the broad way which the author encourages and turn to the chapter in which he summarises the results which he deduces. These are four in number: (1) While engineering, shipping, and other vast industries had to be dealt with because they were *useful* for the conduct of the war, alcohol was the one thing which had to be dealt with because it *interfered with* the conduct of the war. Drinking was found to be a serious national disability and remains so. (2) It is possible effectively to check excessive drinking by legislative control which leaves an amount of liberty sufficient to prevent substantial resistance or evasion. (3) The chief measures in producing this result were shortening of hours, limitation of supply, diminution of strength, and raised prices. (4) It is possible under peace conditions to keep the volume of intemperance far below its old level by means of shorter hours and higher taxation. And as corollaries we may particularly notice three points which Dr. Shadwell insists on. Control will reduce consumption only to a

[1] Drink in 1914–1922: A Lesson in Control. By Arthur Shadwell. London: Longmans, Green and Co. 1923. Pp. 245. 10*s.* 6*d.*

certain point; if it is pushed too far or too fast those who are controlled will rebel, as they did in Sweden in 1918. And the sheet-anchors of control are short hours and high cost. These have proved really efficacious, while State ownership, reduction in public-houses, improvement of premises, disinterested management, and similar devices have failed to exert any perceptible influence on sobriety and public order. This last conclusion will distress those who believe that the quantity of alcohol drunk is of less moment than where one drinks it, and that a man will probably drink less in pleasant and humane surroundings than in a gin-palace. Popular opinion on the reformed public-house is apt to be misled by its manifest advantages for those who do not want alcohol. Those who imagine that the standard of the tea-room is reproduced in the bar should study the author's full account of the Carlisle experiment; whatever other benefits it conferred on the inhabitants, it is difficult to see any evidence that it reduced intemperance to a greater degree than did the restrictive measures which prevailed in the controlled areas generally. Finally, Dr. Shadwell flatly denies that the reduction of drunkenness which obtains at present is due to any general tendency towards sobriety—to that change of heart on the subject which has to some people been the most hopeful sign of permanent and lasting improvement. He admits that such a tendency exists, but thinks that its action is very slow and perceptible only over a long period of years.

The book deserves, and will, we hope, receive, the careful attention of everyone who is concerned in framing temperance legislation. Short cuts might be simpler in the end. It is possible that Benjamin Kidd might have been able to convince Dr. Shadwell that a will to power can make social evolution travel at an extraordinary pace. But the author's plea to drop polemics and give common-sense and coöperation a trial is one which by its sheer reasonableness must receive respect. And he shows plainly that much may be achieved by such characteristically national methods.

KÜMMELL'S DISEASE.

IN a paper read before the Section on Orthopædic Surgery at the seventy-fourth annual session of the American Medical Association, Dr. Fosdyk Jones,[1] of Denver, who reported an illustrative case, stated that the post-traumatic spondylitis described by Hermann Kümmell (Hamburg) in 1895 is a rare but distinct clinical entity caused by direct or indirect injury to the vertebral column. Kümmell described the following three distinct stages in the condition: (1) The stage of initial injury to the spinal column attended with a varying degree of surgical shock, (2) the stage of relative comfort in which the patient is able to carry on his occupation, and (3) the stage in which after several weeks or months, or even two or three years, an angular kyphosis develops with recurrence of pain, which is either localised over the spine or radiates over the extremities. Fracture does not always result from the injury, but in some instances severe contusions of the spongiosa are sufficient to damage the bony framework and cause slow and gradual collapse of the spinal segments. X ray examination, in which both antero-posterior and lateral views are essential, may not show any obvious lesions in the early stage, whereas after months or one or two years the collapse of the vertebral bodies and compression of the intervertebral discs is plainly seen. The diagnosis must be made from Pott's disease, spinal neurosis, contusions, ankylosing spondylitis, back strains, and railway spine. The prognosis as a rule is favourable if early treatment is instituted. The deformity can be controlled by a suitable immobilising apparatus or closely fitting plaster-of-Paris jacket, and fibrous or bony ankylosis can be obtained which will give an excellent functional result. In the more severe types, especially neglected cases, a radical ankylosing operation, such as that described by Hibbs or Albee, is indicated. Dr. Fosdyk Jones's case, which occurred in a boy aged 5, is of special interest in that though the disease may follow injury at any age, it is rarely seen in children, and this was the youngest patient on record in whom it had been observed. The condition occurred as the result of a fall, directly after which the boy remained unconscious for five or ten minutes and then complained of severe pain in the back and thighs. He was kept in bed for two days and then allowed up. A week after the injury a swelling was seen over the lumbar region, but disappeared in a few days after the use of hot compresses. Two months after the accident he complained of severe pain in the back radiating to the thighs, and movements of the spine, especially in a forward direction, were very painful. An angular deformity in the region of the lower lumbar vertebræ was then noticed. There was no paralysis. A clinical diagnosis of Kümmell's disease was confirmed by X ray examination, which showed a compression fracture of the fourth lumbar segment with thinning and compression of the intervertebral discs. A plaster-of-Paris jacket was applied and the pain disappeared. As no increase in the kyphosis took place, an ankylosing spinal operation was not considered necessary.

[1] Journal of the American Medical Association, Dec. 1, 1923.

THE RELATION OF MALARIA TO ALTITUDE.

THE relative rarity of malaria in elevated regions in the tropics has been recognised since the very earliest times, but up to the present no precise observations seem to have been made on the influence of altitude upon malaria. S. R. Christophers has stated that the highest point above sea-level at which indigenous malaria exists is Quito, a town situated on the Equator at a height of 9000 feet, but possessing an even and warm climate. Malaria is prevalent sometimes at 5000 feet in the Himalayas, and at still higher levels, up to 7000 feet, in Southern India. In Italy indigenous malaria is said to occur at an altitude of 8500 feet. The consideration of these facts has led Lieut.-Colonel C. A. Gill, I.M.S., to make more exact observations in the Punjab, and his results are published in the *Indian Journal of Medical Research* for October, 1923. A spleen-rate of 80 per cent. is found at an elevation of 1000 feet, and at the foot of the Himalayas from 2000–4000 feet endemic malaria is very severe. The infection appears to be constant, and this region is not liable to experience the great epidemics which periodically decimate the people of the plains. From 4000–5000 feet endemic malaria appears to be less prevalent and relatively milder in character. The highest elevation in the Himalayas in which indigenous malaria has so far been found is at a height of 5000–6000 feet, while at the hill-stations, which lie from 6000–8000 feet, such as Simla, Kasauli, and Murree, malaria is entirely absent. Epidemiological observations made at the last-named station show that ten species of anopheles, six of which are known to be capable of transmitting malaria in other parts of India, are prevalent. The absence of malaria cannot therefore be ascribed to the paucity of suitable mosquitoes, nor to any deficiency of carriers of the malaria parasite, as 80 per cent. of the summer population, who are temporary residents in this hill-station, come from the endemic centres of the disease.

Climatic factors necessarily play a part. The mean temperature is markedly lower throughout the year as compared with that of the plains. The daily temperature shows a mean range of 10–20° F., the maximum never rising above 80°, while the minimum may fall at certain times of the year to below 40°. Should the minimum temperature at which the anopheles parasite is capable of developing be taken at 61° F., it will be seen that the atmospheric conditions in Murree are suitable for the spread of this disease for at least five months in the year, and hence the absence of indigenous malaria cannot be attributed to any adverse influence exercised by temperature during this period. The experience of the author in other parts of the world

has led him to believe that the humidity of the atmosphere is the chief factor in determining the development of the parasite within the mosquito, and the most striking feature exhibited by the meteorological chart of Murree is the dryness of the atmosphere throughout the greater part of the year. The relative humidity is greatest during the coldest months, and in May it is only 41 per cent. Should the mean relative temperature at which this development can take place be estimated at 63 per cent., it follows that the potential infection period is reduced in this instance to one of eight weeks. To test this point still further, experiments on the transmission of malaria were undertaken with the local anopheles, especially *A. willmori*, and it was found that development takes place when the temperature remained constant—at about 68° F.—with a relative humidity between 79 and 94 per cent.—that is, under the atmospheric conditions which prevailed in Murree during the months of July and August. The absence of malaria in these hill-stations must therefore be ascribed to the very short period during which the infection may be acquired, and this, at the most, does not exist two months.

METABOLISM OF SKI SPORT.

FROM time immemorial the Scandinavian peoples have used skis (Icel. *scidh*, a piece of wood) to prevent them from sinking in the snow on their journeys in the long Northern winter. Ski-ing as a sport is about 60 years old in Norway, whence it was introduced into Switzerland about the year 1900. The last ten years have seen an enormous development of ski-running as a form of winter amusement, and it has now become the object of serious study by physiologists. Prof. A. Loewy has recently published in the *Schweiz. med. Wochenschrift* the results of a study undertaken by him to ascertain whether the sensation of ease experienced by the ski-er necessarily involves a diminished output of energy, and whether ski-ing is superior to walking from an economic point of view, as Liljestrand and Stenström had previously found to be the case with skating and L. Zuntz with cycling. An unskilled ski-runner obviously expends a great deal of unnecessary energy in various balancing and other movements of the body, whereas the movements of an expert are not only fewer in number but are also easier and freer, giving the impression that less energy is needed to cover a given distance with skis than without them.

To verify this impression an estimation of the gaseous exchange is essential. The only observations on the subject hitherto published are some notes by Liljestrand, whose experiments, even though made under specially favourable conditions rarely realised, showed a higher value both for CO_2 output and for oxygen consumption. Prof. Loewy's idea was to ascertain the exchange taking place under "natural"—i.e., ordinary—conditions both with and without skis, on firm and on soft snow, on level and on rough ground. The subjects of the experiments were healthy schoolboys of from 13 to 17 years of age, all of whom were expert ski-ers. The apparatus used was that devised by Zuntz, with which the volume of inspired air could be read off, and the expired air collected and subsequently analysed. A table is given showing for each of the nine individuals tested the volume of air breathed, the CO_2 output, the oxygen consumption, and the percentage of oxygen increase with and without skis on level ground and on a slope. The figures give a good idea of the influence which the condition of the ground exercises on the breathing, but the most important point brought out is that in every case the volume of air breathed is enormously increased—up to 47 per cent.—with the use of skis. Similarly, while the oxygen consumption is much increased when walking on snow without skis as compared with walking on firm snow-free roads—17·3 c.cm. as compared with 13·5 c.cm.—yet with the use of skis it rises still more markedly, the figures in this particular series reaching a minimum of 20·6 and a maximum of 31·8 c.cm. In answer to the possible objection that the height of Davos (1500 m.), where the experiments took place, might have some bearing on these results, Prof. Loewy points out that all the subjects of the experiment were living at this altitude, and were therefore well acclimatised.

It is thus quite clear that from the point of view of expenditure of energy ski-ing offers no advantage over walking; and although in ski-ing on level ground there appears to be invariably an associated sensation of ease and lightness, Prof. Loewy has conclusively demonstrated that this subjective sensation bears no relation to the actual output of energy required, the apparently easier movement involving a considerably greater consumption of energy. The value of ski-ing, however, lies mainly in the greater speed attainable by its means, and in the possibility of moving with comparative safety over ground that would otherwise be dangerous, both these advantages amply justifying the popularity of the sport.

THE OFFICIAL CONTROL OF DISPENSING.

IN a circular (No. 462) just issued under the Sale of Food and Drugs Acts the Minister of Health draws the attention of local sanitary authorities to certain suggestions which he has received from the Society of Public Analysts with regard to the sampling of prescribed medicines. These are to the effect:

(i.) That the inspector be instructed, prior to dividing the sample into three parts, to mark, in the presence of the vendor, the height the contents reach in the bottle in which the medicine is originally supplied to him by the vendor. That the bottle so marked be submitted to the analyst in order to enable him to determine the total quantity of medicine supplied.

(ii.) That the analyst and the medical officer of health be both consulted as to the type of prescription it is desirable to use for the purpose of checking the accuracy of dispensing, and that, in the event of any substantial inaccuracies being disclosed by analysis, both these officers be consulted as to the desirability of instituting proceedings.

The object of the first suggestion is to enable the analyst to ascertain the total quantity of each of the ingredients (including the water or other "vehicle") present in the medicine. If he receives only a portion of the sample, representing an unknown fraction of the whole, he is only able to ascertain the relative percentages of the several ingredients; but if he is also provided with information as to the total quantity of the medicine dispensed he can then deduce the total amount of each of the ingredients as supplied by the chemist. These particulars will obviously be of importance to the authority in considering what action it should take in regard to a medicine which has been inaccurately dispensed. The second suggestion is in accordance with the practice already largely adopted by local authorities. It is clearly desirable that, where a sample of medicine is taken for the purpose of checking the accuracy of dispensing, it should be so chosen as to be capable of accurate analysis. It is also desirable in considering whether or not proceedings should be taken under the Sale of Food and Drugs Acts that proper regard should be paid both to the degree of accuracy obtainable in the analysis of the article in question and to the margin of error allowable in ordinary dispensing operations.

THE DIAGNOSIS UNIT ON ACTIVE SERVICE.

IN the *Journal* of the Royal Army Medical Corps for December, 1923, Dr. Philip Manson-Bahr concludes his useful contribution on Laboratory Diagnosis in the Tropics and Sub-Tropics in War Time. In this paper he calls attention to the value of diagnosis units consisting of one medical officer, two special orderlies, and two drivers. Such units have the advantage of extreme mobility; two of them, in fact, moved to Damascus in 1918 with the cavalry. They are self-contained, possess their own transport, and are able to perform essential work at a rapid rate. During the summer of 1918 six units in Palestine examined more than 40,000 slides of blood for malarial parasites,

discovering a percentage of subtertian infection which varied at the different stations from 2 to 16 and which showed a dramatic rise in the month of October. Malaria simulates other diseases so closely as to be almost undiagnosable without the help of a laboratory; at one of these diagnosis units it was found that 11 out of 15 cases segregated as dysentery and 30 out of 45 cases diagnosed as influenza were really due to subtertian malaria. For the purpose of training the personnel to deal with the diagnoses of malaria and dysentery, 7 officers and 16 orderlies attended a course, lasting six weeks, held some distance behind the line. Within this time it was possible to render the officers, and in most cases the men as well, familiar with the appearance of normal blood cells and the various stages of the malarial parasite, although, of course, the actual diagnosis was made in each case by the officer in charge. The advantage of mobile horse-drawn diagnosis units of the kind described by Dr. Manson-Bahr is apparent from his article and should certainly be borne in mind in any future campaigns. By means of such rapid diagnosis the mechanism of evacuation is accelerated, the work of the field laboratories alleviated, and the routine of the casualty clearing station lightened.

MEDICAL BIOMETRY.

Prof. Raymond Pearl in his "Introduction to Medical Biometry and Statistics,"[1] has attempted to write an introduction to the practice of statistics which shall appeal to the medical reader having no preliminary mathematical knowledge and no primary interest in mathematical lines of thought. With this end in view, mathematical investigations are almost wholly excluded from the volume, the fundamental concepts being developed on experimental lines; an excellent example of this is the chapter on correlation, where the passage from no correlation to perfect correlation is exhibited by a series of experiments. In the first chapter, the author, having dealt with preliminary definitions, lays down the following propositions:—

1. That there is no inherent reason why medicine in every one of its phases should not ultimately become in respect of its methods an *exact* science, in the same sense that physics, chemistry, or astronomy are to-day exact sciences. 2. That this goal will be reached in exact ratio to the extent to which quantitative methods of thought and action are made an integral part of the training in every sort of medicine. 3. That no number or figure can be said to have any final scientific validity or meaning until we know its probable error, the "probable error" being the measure of the extent to which the number will vary in its value as the result of chance alone.

Prof. Pearl gives an historical sketch of the pioneer work done by Graunt, Süssmilch, Quetelet, and Farr. In speaking of the latter, he makes full use of Dr. M. Greenwood's article published in our columns[2] in 1921, which he characterises as "the best existing brief estimate of the significance of Farr in the history of medicine." Following chapters describe the raw data and methods of presentation. The author's account of the Hollerith system will be found very helpful since few private students have the opportunity of seeing or using the machines. Prof. Pearl passes to an exposition of rates and ratios and a short account of life-tables. In speaking of short methods of life-table construction, reference might have been made to Part II. of the Supplement to the 75th Annual Report of the Registrar-General, which describes the method of Dr. E. C. Snow, much the best available. Prof. Pearl next discusses the concept of "probable error" and related notions of probability. In Chapter XIII., the measurement of variation is studied; in the next two, correlation; the work concludes with a short account of simple curve fitting. It will be seen that the book covers much ground, and, in our judgement, its author has successfully accomplished his task. It is natural and right that in his choice of examples, Prof. Pearl should have had the needs of American students chiefly in mind, but this fact will not prevent English public health students from profiting fully by a study of the book. Since, under the new regulations of the General Medical Council, a less superficial acquaintance with the elements of vital statistics is demanded of candidates for the D.P.H. than before, the book should enjoy a wide circulation; we know of no other likely to be equally useful to the medical student. The literary style is agreeable and the expression of opinion on disputed points temperate, with the possible exception of a footnote on p. 224, where the animadversions upon Mr. J. M. Keynes's treatise might have been expressed more courteously. We gather from the preface that Prof. Pearl has in mind to publish a sequel to this book; should it be as well written as the present volume, advanced students will incur the debt of gratitude which this book imposes upon beginners.

[1] London: W. B. Saunders Company. 1923. Pp. 379. 25s.
[2] Medical Statistics, THE LANCET, 1921, i., 985.

RECOVERY BRANCHES OF HOSPITALS.

IN reporting last week the meeting of King Edward's Hospital Fund for London, brief mention was made of the report of a committee on the "recovery branches" of London hospitals. This report was presented by the chairman of the Hospital Economy Committee, Mr. Leonard L. Cohen, who remarked that the apparent cheapness resulting from the low cost per bed at the branch was largely illusory. Four of the large London hospitals have branches wholly or largely devoted to recovery work as distinct from convalescent work. These are the Elizabeth Garrett Anderson Hospital for Women (at Barnet), the London Hospital (at Reigate and now also at Mitcham), the Royal Northern Hospital (at Southgate), and St. George's Hospital (at Wimbledon, partly recovery and partly convalescent). There is no doubt that convalescent patients benefit by the better air and the comparative quietude of their surroundings at these recovery hospitals; there is the further advantage that the number of cases passed through the parent hospital can be thereby increased. It was also thought at one time that the average cost at the branch would be much lower than at the hospital, but in respect of this financial saving the advantage appears to have been exaggerated, and any hospital which established a recovery branch on the strength of this argument might find itself involved in unexpected financial liability. The resemblances between the recovery branch and any other addition to the bed accommodation of a hospital are far greater than the differences. The addition of a recovery branch, moreover, concentrates in the parent hospital a larger number of patients who need expensive methods of diagnosis and treatment, thus enabling fuller use to be made of a highly specialised staff and apparatus. The wider adoption of the system should properly be regarded as a form of hospital extension, the additional beds merely being at a distance instead of on the hospital site. It is in fact an economical and efficient method of extension.

THE COMMON COLD.

"THE amount of absenteeism in large business and industrial establishments due to minor illnesses is seldom appreciated until the facts are thoroughly reviewed." This is the opening sentence in a recent Statistical Bulletin of the Metropolitan Life Insurance Company of New York (Vol. IV., No. 11), where an analysis is made of the loss of time due to the "common cold" among 6700 clerical employees at the company's central office. During the year ending July 28th, 1923, no fewer than 2824 common colds, involving disability for work, were reported to the company's medical staff, infection occurring at a rate of 421 per 1000 employees for the year. We are not told what degree of streaming nose determined the disability for work or whether the risk of infecting others counts more in New York than it does here as an excuse for absence. The average number of days of disability per person on the pay-roll for the year was 0·9, and

the average number of days off work per case 2·2. On the whole in this one office 6233 days were lost in the year from common colds, among which, be it noted, were generously included acute bronchitis and tracheitis. Two periods of maximum incidence were observed, the first following the advent of cool weather in the late summer and early autumn, the second during the following January or February when the coldest weather of winter prevails. This twofold prevalence suggested the occurrence of two types of catarrhal fever, possibly interrelated in some way. From a careful study of the figures it appears that in New York there is a close relation between the number of common colds and the rise and fall of the weekly mean temperature, a drop of 10° F. carrying with it an increase of 18 colds per week in this group of 6700 people. A chart reproduced in the Bulletin shows graphically the inverse ratio of colds and temperature. On the other hand, relative humidity and total precipitation seemed to have little or no influence on the incidence. The Bulletin suggests that the annual downward swing of temperature can be compensated for by proper attention to clothing, to ventilation, and to the heating of homes, workplaces, and means of transportation. We need not conclude, and, indeed, the Bulletin does not imply, that the fall of temperature in itself is responsible for the infections—it may just as well be the indoor habit of life to which the drop of temperature gives rise; and it remains to be seen whether the evil would be substantially mitigated by keeping the insurance clerk all day long, at work and at play, in a uniform temperature. Experience does not suggest that those who pay most attention to warming their aura secure thereby much immunity in comparison with their less protected associates. The relationship between the two groups of minor infections is being further studied. We are glad to learn that the U.S. Public Health Service is inaugurating a study of common colds over a prolonged period. It is remarkable what little definite knowledge there is regarding the epidemiology of these mis-called minor ailments, which are the bane of civilised life and a constant menace to the prestige of medicine.

A SORDID STORY.[1]

THE publication of the story of a trial that has excited considerable emotion of an unwholesome kind in the public mind, within about 12 months from its conclusion, is open to the criticism that the time which has elapsed is too short for dispassionate and therefore impartial examination of the evidence to be possible. This latest volume of the excellent Notable Trials Series has been edited by a journalist of ability, who has not confined himself in his introduction, as some of the lawyers who have treated other criminal trials for the same publishers have done, to a judicial setting forth and summary of the facts and circumstances of the case. He prefers to criticise judge, counsel, and conclusions of the jury, mainly in order to convince us that Edith Thompson was wrongly convicted. He condemns, for example, Sir Henry Curtis Bennett, a not inexperienced advocate, for having "lost one of the opportunities of his lifetime when, after the confused and uncertain opening of the Solicitor-General," he did not keep Mrs. Thompson out of the witness-box, and leave the prosecution to fulfil their admitted obligation to prove the case against her. He condemns equally the very unemotional judge who tried the case, for references to Bywaters as "the adulterer," asserting that adultery is to young people of the present day "merely a quaint ecclesiastical term for what seems to them the great romantic adventure of their lives." Mr. Young appears to us hardly to appreciate the position of a jury, who had to consider whether Mrs. Thompson, in fact, suggested and instigated the murder of her husband, which she did nothing to prevent when it took place, rather than whether she was determined, when she wrote her notorious letters, that Bywaters should stab Thompson, or believed him to be capable of doing so. However, whatever her mental reservations may have been, neither her condemnation, nor his, laid any heavy responsibility on the medical witnesses called by the prosecution. Dr. P. J. Drought, who described the wounds on the murdered man, was quite clear that the fatal wound was due to the last blow inflicted, and was of the opinion, but not positively so, that the blow was struck from behind; and his evidence, on the whole, was not inconsistent with the story which was told by Bywaters, and which was not believed by the jury, in description of how the struggle began. Mr. J. Webster and Sir Bernard Spilsbury, if they did not prove that Mrs. Thompson had never administered poison or powdered glass to her husband in order to kill him, stated that no traces of any such attempts to murder remained in the organs submitted to them. The medical and scientific evidence in the case was neither vital nor challenged, and it is not necessary to recapitulate here the history of a crime and a trial still fresh in the memory of those interested. We regret the way in which a sordid story has been presented.

[1] Trial of Frederick Bywaters and Edith Thompson. Edited by Filson Young. Notable Trials Series. London and Edinburgh: William Hodge and Co. 1923. Pp. 293. 10s. 6d.

THE VENEREAL DISEASE SOCIETIES: A FUSION OF WORK.

THE eighth annual report of the National Council for Combating Venereal Diseases has just been issued and covers the year ending June, 1923. While the Council has to regret a pecuniary stringency which has been common to all voluntary associations in these times of financial stress—a stringency which has compelled them both to cut down their personnel and move to smaller offices—the latest report shows that activity in propaganda has in no way been abated. The outstanding feature of the year has been a wide and also intensive dealing with venereal problems internationally, which culminated in the institution of the Union Internationale for the study of the subject, and the last report of the National Council deals fully with the objects of this new union. There is also issued with the report a précis of the important meeting held in November last at which the fusion of the National Council for Combating Venereal Diseases with the Society for the Prevention of Venereal Disease came into definite form, with the result that the British voice in international affairs will now have the advantage of unanimity in principle. It will be remembered that at a previous conference of the two bodies the following resolution had been approved:

> Subject to the approval of their respective executives this conference resolves itself into a deputation to the Ministry of Health to urge that the law should be altered so as to permit properly qualified chemists to sell ad hoc disinfectants, provided such disinfectants are sold in a form approved and with instructions for use approved by some competent authority.

It was then seen that the main obstacle to concord was about to disappear, and at a meeting last November of the National Council it was announced that both bodies had accepted the report of a committee of inquiry on the matters at issue, so that the new chairman of the National Council, Lord Trevethin, was able to state that the damage to both organisations in the eyes of the general public, due to their dissensions, would no longer be felt.

In respect of the international movement, Mrs. Neville-Rolfe, the general secretary of the National Council, attended a conference at Paris, when it was agreed that a union should be formed of all the national organisations engaged in the work of combating venereal diseases. The immediate work before this union is stated under the following headings: Rendering non-infective the maritime and colonial services; surveillance of emigration; surveillance and concerted action along the frontiers; international measures for the suppression of quackery; a single moral standard for both sexes; and to study

generally the principles of legal responsibility, compulsory notification and treatment, and penalties. There is, then, every chance that some of the gross causes of the dissemination of disease will disappear, while the voice that should be heard with particular respect, as coming from the main maritime power of the world, will lose none of its emphasis from detailed differences of opinion among honest workers.

THE WORSHIPFUL COMPANY OF PLUMBERS.

Dr. F. J. Waldo, recently Master of the Worshipful Company of Plumbers, has re-issued his little history of the Company, which makes interesting and informing reading. This history dates back through many centuries and shows how a craft guild, by tenacious effort, can maintain its organisations in the face of many vicissitudes. The Charter of James I. brings us definitely into a modern sphere of thought, for it stated that it was granted for the utility, advantage, and relief of the good and honest, and for the terror and correction of the evil, deceitful, and dishonest. The ordinances of the Company from the reign of Edward III. up to this charter are set out, together with a description of the arms of the Company, in the following phraseology of Elizabethan heraldry:—

"And whereas the most ancient and necessarye Seyence of Pluming dothe no lesse deserve to be remunerated then any other mysterye or Arte whatsoever, I the sayde Clarencieulx King of Armes by power and aucthority of my office, granted unto mee by Letters Pattent under the Broade Seale of Englande have geven graunted assigned and allowed and by their putes doo gyve graunte assigne and allow unto the sayde Companye of Plumers and theire succesors forever this theire Armes and Creast following: Vialt or on a Cheveron Sable towe soodring irons in saultor with a cutting knyfe and a shaver argent; in Cheife between two sounding leades proper, a Jacobs staffe of the seconde, and in poynt a water levell of the same. And for theire Creast upon a Heaulme on a wreath or and sable a ffountayne argent garnished on the toppe with an Archangel holding a sworde and a Ballance or with this their ancient worde or device Justicia et Pax."

As is well known, a system of voluntary registration of plumbers was inaugurated by the Company of Plumbers 40 years ago at the time of the International Health Exhibition. The Company is not wealthy, as may be gathered from the fact that its chief source of income has been derived from the sale of its hall, and it is reasonable to think that the time may have come when the registration of plumbers should cease to be voluntary and those who desire to become plumbers should pay a definite fee of registration after showing that a certain standard of proficiency has been reached. A high standard of plumbers' workmanship is necessary for the carrying on of the business of this life, as the Charter of James I. indicates, and all the public is interested in is being able to distinguish a man of competence and training from the father of Joseph Vance, and in promoting a proper system of technical education for those responsible for domestic sanitation.

THE CASE OF INSURANCE PRACTICE.

AT the Court of Inquiry into the insurance capitation fee, whose first sitting is to-day, Friday, Jan. 4th, the case presented on behalf of the insurance practitioners by the Insurance Acts Committee of the British Medical Association will run on lines which all familiar with the question have confidently anticipated. And as the arguments are sound we would not have them altered. Medical men working under the National Health Insurance Acts cannot, and do not, expect to escape the effects of financial stringency, but the medical profession has already given evidence of its willingness to make sacrifices, while the conditions of panel practice are so arduous that unless remuneration is adequate the quality of the service must be rendered less secure. The well-known places in which the services of insurance practitioners can be differentiated from the work of private practice are again set forth with great clearness and in proper perspective.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LII.

THE PALLIATIVE TREATMENT OF TOOTHACHE.

IT often happens that an individual afflicted with toothache seeks the aid of a doctor because that of a dentist is not available. Successful relief of the pain requires a knowledge of the pathology of dental disease. Toothache or odontalgia is due to two causes: inflammation of the pulp (commonly, though erroneously, called the nerve), or pulpitis, and inflammation of the dental periosteum or periodontitis. A correct diagnosis is essential, for the treatment of the pain arising from these conditions is different.

Due to Two Causes.

Pulpitis usually arises as a sequel to dental caries, though it may follow occasionally from other causes, such as fracture of a tooth. The pulp is a delicate and complex structure containing an abundance of nerve fibres and blood-vessels, which enters the tooth by a narrow opening at the end of the root. The cavity in which the pulp lies, being formed of dentine, is rigid. Thus in hyperæmia of the pulp the dilatation of the vessels occurs at the expense of other elements of the pulp, and is most marked at the constricted entrance. This serves to explain the severe pain of pulpitis and the reason why suppuration and gangrene so commonly occur; the delicate nature of the pulp and the anatomical factors allow of only a limited power of repair. The pain is sharp and shooting; it tends to occur in acute paroxysms which may suddenly cease, and is usually worse at meal-times, for food gets jammed into the cavity and increases the tension. Thermal changes affect the pain. Sometimes cold will relieve it in the early stages by constricting the blood-vessels; later both heat and cold intensify it. Chemical stimuli (sweet and acid substances) may increase the pain, possibly by altering the osmotic tension in the pulp. The pain is usually more severe when the patient lies down. If the pulp is actually exposed at any point, pressure on this exposed area causes excruciating pain. Even cotton-wool pressed lightly in the cavity causes suffering out of proportion to the pressure used. In the later stages, when suppuration has commenced, the pain becomes worse and throbs; it may not be localised in the tooth which is the cause, but may be referred to any other tooth on the same side, even from a lower molar to an upper. In such a case a painful stimulus applied to the lower tooth may cause an immediate exacerbation of pain referred to the upper. The pain may be referred to other areas supplied by the fifth nerve, and, in addition, there may be associated areas of hyperæsthesia of the skin of the face, which have been mapped out by H. Head.

Periodontitis.—The periodontal membrane is both a supporting and nutritive structure. Its fibres are attached to the root and to the bone of the socket; thus it is the means of attaching the teeth to the jaw. The membrane is well supplied with blood-vessels and nerves. Although the periodontal membrane is frequently infected via the gum margin, as in pyorrhœa, the inflammation rarely gives rise to pain, for the pocket formed by the progressive ulceration from the surface allows of drainage and prevents tension. When the periodontal membrane is infected via the pulp canal following gangrene of the pulp, pain is common. A normal tooth is capable of slight movement in all directions through stretching of the fibres of the periodontal membrane. This buffer-like action of the membrane lessens the impact of mastication. In periodontitis the engorgement of the vessels causes the tooth to rise slightly in its socket, the

first symptom being a slight persistent soreness, which is increased when the teeth meet. The tooth feels longer than its neighbours; indeed, it *is* longer, and thus the whole force of mastication falls on the inflamed tooth. At this stage gradual pressure on the tooth may bring relief by emptying the vessels, though a sudden impact is painful. As the inflammation increases and the tissues become filled with exudate, the tooth rises higher in its socket and becomes perceptibly loose. The pain assumes a dull, boring character, and the slightest pressure on the tooth increases it. Thermal changes do not affect the tooth, nor does pressure in the cavity increase the pain, except through pressure transmitted to the membrane. The gum over the root becomes red and tender. When suppuration occurs the pain assumes a persistent throbbing nature, worse at night, until the pus makes its way through the periosteum of the bone, when the tension is lessened and the appearance of a swelling, usually in the sulcus between the gum and cheek, is often followed by a striking diminution of the pain.

Differential Diagnosis.

This should not be difficult, though in pulpitis the localisation of the tooth involved may not be easy. A few dental instruments, such as a mouth mirror, two or three dental probes, a pair of dental conveying forceps with curved ends, and a couple of excavators will be found useful. The history of the pain is important in differential diagnosis. Pain during eating, or when taking hot or cold fluids, or sweet substances, points to pulpitis. Paroxysmal pain is certainly due to an inflamed pulp. Dull and constant pain, unaffected by heat and cold, but made worse by pressure on the tooth, suggests periodontitis. In an obviously carious tooth superficial débris should be removed with an excavator. A probe should be used cautiously, lest the exposed pulp should be touched. Thermal tests should be applied: warmth by heating the handle end of a metal instrument, and placing the hot instrument on the dried crown. As for cold, if cotton-wool sprayed with ethyl chloride is exposed to a current of air it will freeze, and may then be applied to the tooth. Periodontitis is easily diagnosed by tapping the teeth with a metal instrument; this will at once reveal any tenderness. There is often an associated periodontitis in acute pulpitis, but it is slight and should not lead to confusion. Periodontitis tends to spread by continuity, so that more than one tooth may be tender, but the chief culprit will be looser and more tender than its neighbours. Digital exploration of the inner and outer gum side may reveal a tender or swollen area. Pain due to periodontitis is more localised than that caused by pulpitis, and referred pain is less common. The absence of a cavity in a suspected tooth should not preclude the diagnosis of periodontitis, for the pulp may have died as the result of a fall or blow. Such teeth are usually discoloured.

Treatment of Pulpitis.

If there is a large accessible cavity, the superficial débris should be removed with an excavator, the cavity should be dried, and a small pledget of wool dipped in pure phenol or oil of cloves is placed therein. A convenient preparation of phenol is carbolised resin. This consists of pure carbolic acid, 4 parts; resin, 4 parts; and chloroform, 3 parts. The mixture forms a viscid fluid. A small piece of wool should be dipped in this and placed in the tooth, and should be protected from the saliva by a watertight dressing. The use of gutta-percha is not advisable, except by an expert, for it must be used hot and packed in under pressure, and may thus increase the pain instead of relieving it. A convenient dressing is wool dipped in gum-mastic or gum-sandarac. This sets hard enough to last several days. In addition, the gum should be painted with tincture of iodine to aid in depleting the vessels of the pulp. Equal parts of the weak and strong tinctures of iodine form the best preparation. Counter-irritation is only an adjuvant in the treatment of pulpitis. Success cannot be guaranteed, but providing the inflammation has not gone on to the stage of suppuration and that the right tooth has been treated, the pain will in many cases be relieved for a few days. If these measures fail anodyne drugs may give relief; tr. gelsemium, 10-minim doses, may be combined with pot. brom., 10 gr. But drug treatment represents a less desirable and less certain means of relieving pain.

Treatment of Periodontitis.

In these cases the pulp is dead, and it is useless, and indeed harmful, to place a dressing in the cavity of the tooth. Any possibility of drainage through the pulp canal would thereby be made impossible. A piece of wool placed in the cavity during meal-times, and removed afterwards, is useful in preventing food from being jammed in the pulp canal. The only possible treatment is counter-irritation applied to the gum. Tincture of iodine, to which some tincture of aconite has been added, is the best drug. The gum should be dried and the excess of iodine squeezed out of the wool before applying. Penetration of the drug is increased if a current of warm air is directed on the gum. The strong tincture may be used, but should not be applied more than once. In subacute periodontitis counter-irritation is often efficacious, unless suppuration has supervened. A hot mouth-wash should be used frequently, the heat being more important than the ingredients, though weak carbolic is perhaps the best. A smart saline purge may help in the early stages. In severe periodontitis extraction is often the best treatment. Since such teeth are loose and their extraction may not be difficult, the medical practitioner need have the less hesitation in attempting their removal. A local anæsthetic should never be used in acute periodontitis, for the injection of fluid into the inflamed gum may result in severe after-pain and even necrosis.

L. E. Toney records[1] a case in which severe toothache was relieved by cocainisation of the sphenopalatine ganglion. A drop of saturated aqueous solution of cocaine was applied to the mucous membrane just posterior to the posterior tip of the middle turbinate bone. The pain ceased in five minutes. In obstinate cases of toothache, which cannot be relieved by other ways, this method might be worth a trial.

Treatment of After-Pain following Extraction.

The aid of the medical practitioner may be sought to relieve the pain following extraction of a tooth. If there has been laceration of the gum or splintering of bone the pain may be severe. The best way to relieve it is by irrigation of the socket. A syringe with a narrow nozzle and of about an ounce capacity should be used. The best lotion is carbolic, 1 in 100, as hot as the patient can tolerate. The socket should be gently flushed out several times, and the lotion used frequently as a mouth-wash. This will give great relief in a short time. If the pain is very acute, and there is a history of the tooth having been fractured, the pain is often due to the end of the pulp projecting from the broken root. Relief will be given by drying the socket and swabbing it out with pure phenol, or instilling powdered orthoform.

Conclusion.

It must be emphasised that the palliation of toothache cannot always be promised by measures short of those only available to the dentist. But the attempt to relieve pain is always worth making, and if a correct diagnosis has been made the attempt will often be successful.

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[1] Jour. Amer. Med. Assoc., Nov. 10th, 1923.

Public Health Services.

A BRIEF HEALTH SURVEY.

DURING last year numbers of reports reached us, often containing in addition to the prescribed tables and summaries the considered views of men and women engaged in various branches of the public health service upon the material presented to them in 1922. We have already devoted considerable space to comments upon some of these reports—space precluded noticing every one—and it may be of interest to recapitulate here some of the more general lessons to be drawn from them.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Statistics.—Apart from the epidemic of influenza during the first quarter, 1922 was a healthy year. The death-rate in most districts was a low one. The infant mortality-rate was frequently the lowest on record, although as usual the mortality among illegitimate infants was double that of legitimate. In many districts the tuberculosis rate, though low, showed a slight rise compared with 1921. The cancer rate in most districts was higher than that for all forms of tuberculosis. Many medical officers of health issued leaflets on cancer, the chief points emphasised being the avoidance of all forms of chronic irritation and the need for securing immediate medical advice on the appearance of well-recognised danger signals. The fatality of diseases of the respiratory system was largely increased by the influenza epidemic and a comparison of the fatality of these diseases in various districts showed a marked difference between town and country and between towns with clean air and those with dirty air. The reports have not indicated any serious desire on the part of the public to tackle the subject of smoke prevention.

Tuberculosis.—Many medical officers expressed dissatisfaction with the results of expenditure on tuberculosis schemes, and a considerable number stressed the importance of establishing complete convalescence after ailments of childhood and thus preventing the onset of active tuberculosis. A general complaint was that the disease is not notified at a sufficiently early stage. There appears to be a shortage of accommodation for advanced cases especially in counties, and a general shortage of accommodation for the so-called pre-tuberculous children and for children suffering from what is known as surgical tuberculosis.

Maternity and Child Welfare.—The need for more maternity homes appears to be general, and is rendered more urgent by the scarcity of houses. Many medical officers point to the necessity for more efficient antenatal work if the high maternal mortality and damage-rate from childbearing and the more or less stationary neonatal mortality are to be combated. The statistics show a great difference in the childbirth mortality in the various districts. For example, during 1922 the maternal mortality from childbirth in Glasgow was more than twice that of Liverpool or Birmingham. What has been the effect of the scarcity of houses on this mortality it would be difficult to say. Several schemes have been described in the reports under which the midwives are subsidised to carry out elementary antenatal work. More and more of the births are being attended by midwives.

Venereal Disease.—From most centres a decline in cases and an increase in attendances is reported. This is all to the good, but the reports show that a more determined effort is needed to secure control of the syphilitic expectant mother, and also the provision of immediate skilled treatment for cases of ophthalmia neonatorum.

Housing.—An almost general scarcity of houses is reported. Renovation of existing houses is thereby rendered impossible. Trade depression and high cost interfere with proper repairs. There is evidently much overcrowding. New municipal houses are frequently sublet in part because the rent is beyond the reach of the tenant's pocket. Several medical officers prophesy an increase in tuberculosis if an adequate solution of the housing problem is not found soon.

General Sanitation.—Owing to the need for economy, little is being spent on schemes of drainage and sewage disposal, water-supplies, conversion of privies, hospital and sanatorium extension, public abattoirs, and the like. There are many complaints with regard to refuse dumps, especially with regard to London refuse, but again the need for economy appears to stand in the way of an effective solution.

Administration.—Better coördination between child welfare and school medical departments has been frequently advocated in the reports. Closer coöperation between county councils and urban and district councils has been arranged, for example, in the case of Essex and Derbyshire. Large urban districts wish to have the control of the midwives brought into their maternity and child welfare schemes. The unvaccinated condition of the population has been a subject of frequent warning. There is a welcome tendency, in these days of motor ambulances, to reduce the number of white elephants by means of joint small-pox hospitals and to avoid the danger of missed cases of small-pox by utilising the services of expert diagnosticians. Such improvements in administration cost nothing.

Health Education.—Many medical officers lay great stress on the advantage to be expected from the better education of the public in hygiene, and more particularly in the right choice of food. It is unnecessary to labour the point that an educational policy of this kind is possible when other more ambitious schemes have to be postponed on account of financial stringency.

From the public health point of view it may be conceded that 1922 was a very difficult year owing to the prevalence of distress due to unemployment. Careful inquiries have been made in many districts, and there is some satisfaction in being able to record that owing to the coöperation of the various relief organisations little or no effect of the continued distress has shown itself either in the mortality-rates or in the state of nutrition of the school-children.

SCHOOL MEDICAL SERVICE.

A considerable number of school medical officers' reports have passed through our hands during the year, and, much as we have been impressed by the high standard of attainment in face of formidable difficulties, practical as well as economic, the real sincerity of effort presented in these reports has impressed us even more. The aim of the school medical service is dissemination of health by prevention of disease in the young, and encouragement of a health conscience amongst the population generally. A health conscience is by no means synonymous with the health consciousness, rapidly being fostered in American schools by means of instruction and literature, which, if not checked, is likely to have a disastrous psychological effect sooner or later. In this country the school doctor is now an institution firmly established in the general routine. His removal would be a national calamity. The children of those who passed through his hands 15 years ago when medical inspection of schools became statutory are making his acquaintance to-day. In many areas treatment for defects follows closely on the heels of inspection, and it would not be unsafe to predict that in ten years time this will be the natural order throughout the country. Special schools of every kind, these reports show, have materialised, and are materialising through the efforts of the school doctor in spite of financial stringency.

We cannot help being struck, however, on reviewing the reports, by the profound apathy of public opinion on the general conditions prevailing in the majority of elementary schools. Last year school medical officers'

reports on school buildings revealed a standard of general hygiene alarmingly low. This year we find very little record of improvement in this direction. The amenities of life in our elementary schools should surely approach as far as possible those of the ordinary middle-class household. How far they fall short of this is known to every school doctor. Children, perhaps more especially in country districts, leave school at 4 P.M. in the wet clothes and sodden boots they sat down in at 9 A.M. In such manner are laid the foundations of disease—tuberculosis, rheumatism, chorea. It ought to be possible—indeed, a few schools find it perfectly simple—for children to make in class cheap warm slippers and woollen stockings into which to change on entering school; and to devise some means of drying clothes and boots, even in the depths of the country, ought not to be past the wit of man. Then again there are schools where wash-hand basins, but neither soap nor towels, are provided; there are others with wash-hand basins but no water; in some for a hundred children the provision is a single towel, changed weekly. In not one school in a dozen are children's closets supplied with toilet paper; indeed, one school doctor reported that conditions in this direction were worse than in the front-line trenches. Many schools in this country have no drinking water, many provide one drinking cup for the whole school, others one for each department. The continental system of releasing a jet of water into the mouth by pressing a button has hardly reached us yet. In the matter of floor space, too, England has, of all the world, the smallest national requirement. It has not been changed since the Education Act of 1870.

These points are brought forward in no carping spirit. The school medical service has done more in a few years to raise the health standard throughout the country than was ever contemplated. It has demonstrated, too, by careful research on growth, malnutrition, and mental retardation, amongst other things, the important rôle played by environment in the moulding of character. Although by no means the major part of the child's life is spent in school, it is to the school he looks for guidance, and habits formed there go far to making the man. Theoretical teaching of hygiene without practical application is wasted time and effort. A higher minimum requirement of every-day hygiene should be laid down for the public elementary schools; and while recognising how difficult a task awaits the reformer in this direction, we would, in all seriousness, recommend its urgency to the school medical service, which alone can educate public opinion on such a question.

MENTAL HOSPITALS SERVICE.

Improvements in this service are to be observed in many cases. There has been a notable increase in the provision of out-patient treatment for incipient cases. Buildings which had fallen into dilapidation during the war years have been repaired or reconstructed, better diet is reflected in a reduced incidence of tuberculosis, staffs have been increased, and more specialised work is being undertaken, some pathological, psychotherapeutic, and medicinal, by resident staffs, and some, such as dental and surgical, by recently appointed visiting officers. There are, however, institutions in which some of these changes have yet to be made. There are many more in which formidable barriers stand in the way of changes which are deemed necessary for the welfare of their inmates. The buildings themselves are ugly without and within, badly arranged, inadequately lighted and heated. No separate accommodation exists for recent admissions or for cases of open tuberculosis. The airing grounds are small, and the washing, sanitary, and general domestic accommodation antiquated. Laboratories, therapeutic baths, operating theatres, X ray equipment, and private rooms for interviews and psychotherapy are non-existent. Medical officers are often inadequately paid, and entry into the service is discouraged by the fact that married quarters are often available only for superintendents. Promotion is slow, and dependent rather on business and organising ability than on professional attainments. Women whose character and education fit them for the work of a mental nurse cannot be persuaded to enter the nursing service in sufficient numbers, and an unduly large proportion of nurses, both male and female, never obtain their certificate. Provision for "after-care," where it exists, is patchy and incoördinated, and money allowances are often not available for patients on leave of absence.

Not the least anomalous feature of the present service is its gross inequality. Whereas the native of Cardiff, Birmingham, or Edinburgh is received into a modern or modernised hospital, excellently staffed and equipped, the pride and concern of every intelligent ratepayer in the city, the insane poor of many districts must be relegated to institutions labouring under the depressing handicaps outlined above, the work and needs of which are practically unknown to the vast majority of those who, as local government electors, are responsible for their welfare. Too much is being sacrificed to economy, and as the law stands no one can interfere. Visiting commissioners "recommend," and occasionally "protest," as at the flagrant example of Carnarvon, where the medical staff has been reduced deliberately from three to two members, but their biennial recommendations are repeated so interminably, so plaintively, and with so little effect, as to become ridiculous and even pathetic.

It would be unwise to rely on the likelihood of convincing each individual local authority of the need for heavier expenditure on the insane. But there is another reason for the need of some sort of unified control, for only under such control could the existing and projected resources of the service be used to the best advantage. When such an authority comes into existence, it will destroy some of the oldest and most dreary asylums, utilise the remainder of this class for the housing of the incurably insane, and build new and genuine "mental hospitals," properly staffed and equipped, for the reception of recent, and the treatment of recoverable, cases. Although there is no immediate prospect of any changes on this scale the volume of more or less enlightened public opinion from which they must ultimately result has certainly increased during the last few years.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdrs. A. R. H. Skey, R. H. Mornement, J. H. Fergusson, H. C. Whiteside, and J. R. Muir to be Surg.-Capts.

Surg. Comdr. C. J. E. Cock is placed on the ret. list with the rank of Surg. Capt.

Surg. Lt. G. D. G. Fergusson to be Surg. Lt.-Comdr.

ROYAL ARMY MEDICAL CORPS.

MILITIA.

Maj. W. R. Gardner relinquishes his commn. and is granted the rank of Lt.-Col.

TERRITORIAL ARMY.

Capt. W. Baxter (late R.A.M.C.) to be Capt.

TERRITORIAL ARMY RESERVE.

Capt. D. H. Scott, from General List, to be Maj.

ROYAL AIR FORCE.

Flying Officer G. Kinneir is promoted to the rank of Flight Lt.

INDIAN MEDICAL SERVICE.

The King has approved the retirement of Lt.-Cols. J. Entrican and D. MacD. Davidson.

Shiv Das Suri, Shambhoo Dayal Misra, Subbier Annaswami, and Amar Nath Duggal to be temp. Lts.

Special Articles.

SURGICAL TUBERCULOSIS IN ADULTS: THE WORK OF THE M.A.B.*

ST. LUKE'S HOSPITAL, LOWESTOFT.

VISITORS to Lowestoft will doubtless remember the magnificent Empire Hotel which was built on the front about a score of years ago. The promoters of this palatial building grudged no expense, and they anticipated that it would prove an attractive and fashionable centre. It was not, however, a great success, and when the war came, the hotel was occupied by soldiers, and its parquet floors supported a machine gun instead of dancers. For some time after the war the hotel stood as an empty neglected shell—a white elephant embarrassing its owners. At this stage the Metropolitan Asylums Board stepped in and careful inquiries were made as to the suitability of this building for a hospital for surgical tuberculosis. This proving to be the case, the purchase was completed and the hotel with its beautiful oak and mahogany panelling, stained glass windows, lofty billiard room, library and reception rooms came into the possession of the M.A.B. Many alterations had, of course, to be made. The central heating system was very imperfect and had to be entirely reconstructed. Even the kitchens required a certain amount of re-modelling; a grill, for example, may be essential to an epicure, but is out of place in a hospital. The six storeys are connected by four lifts, only two of which carry human beings. The hospital provides its own electricity, it has an up-to-date X ray outfit, a 12-inch coil (100 volts), a Coolidge tube, &c.

St. Luke's Hospital for Surgical Tuberculosis at Lowestoft.

Scope of the Hospital Work.

The hospital takes only cases of surgical tuberculosis in adults—i.e., patients over the age of 16. It is the only institution of its kind under the M.A.B. and it fills an important gap in the tuberculosis scheme of this organisation. Before St. Luke's Hospital was opened on May 9th, 1922, the M.A.B. possessed no special institution to which it could admit adult cases of surgical tuberculosis, although in Queen Mary's Hospital at Carshalton and Princess Mary's Hospital at Margate it had for some years past maintained several hundred beds for juvenile patients of this type. St. Luke's is open to L.C.C. patients, and about 99 per cent. of the patients hitherto admitted are Londoners. It is inevitable that a first-class institution like this must attract the attention of the health authorities in the neighbourhood, but the needs of the L.C.C. have, of course, to be satisfied first. Nevertheless, if an arrangement for the admission of local cases could be made, it is one which might well be profitable to all parties. The hospital has facilities for expanding its present accommodation, and the cost of running a few dozen more beds would be considerably less in this institution than in an independent concern requiring a new central organisation.

The female staff numbers 66, including 37 nurses. The male staff numbers 27 and lives outside the institution, while the female staff sleep in. The doctors are resident. At present the medical superintendent has only one assistant, but a third medical officer is shortly to be appointed. The wards vary greatly in size; the largest female ward has 25 beds. On the first floor two or more rooms have been thrown into one, while others retain their original size. The wide range of choice between large, medium-sized, and small wards has enabled the staff to distribute the patients to a certain extent according to their instincts—the gregarious instinct or its opposite. What this means to the comfort of the patients, only those can tell who have had experience of running a large institution like this.

Accommodation.

At present there is accommodation for 94 male and 70 female patients. There is no arbitrary limit to the duration of residence, the average being from six to eight months for patients with tuberculosis of the bones. This average is only four to five months for patients suffering from tuberculous adenitis or peritonitis, and the patients who come for observation and diagnosis sometimes only stay a few weeks. Pulmonary tuberculosis does not, of course, qualify a patient for admission, but in a small proportion of cases it is found as a complication of surgical tuberculosis. It must, by the way, be sometimes rather

* An article on Surgical Tuberculosis in Children: the Work of the M.A.B. appeared in THE LANCET of Sept. 23rd, 1922 (p. 683), and one on Pulmonary Tubercle in Adult Males in THE LANCET of Dec. 2nd, 1922 (p. 1189). All three articles are the outcome of visits by our own Commissioner).

difficult to say when surgical tuberculosis is complicated by pulmonary tuberculosis, and when the reverse is the case. At first a relatively high proportion of the total were gland cases, an accumulation of which had occurred before the hospital was opened. But it is anticipated that the proportion of spine and joint cases will increase as time goes on. During the last 12 months the hospital discharged the following cases: Spines, 63; hips, 43; knees, 25; other joints and bones, 30; abdomen, 16; peripheral glands, 28; genito-urinary system, skin, &c., 14.

Factors in the Treatment.

Dr. W. M. Oakden, the medical superintendent, considers rest by far the most important remedy in the acute phase of surgical tuberculosis. About two-thirds of the patients are confined to bed, the numerous verandahs of the hospital providing plenty of fresh air and some of the sunlight which struggles out even in winter, and in the British Isles. Heliotherapy and radiotherapy are not practised with the fervour shown in some of the continental hospitals for surgical tuberculosis, and tuberculin (B.E.) is given only in selected cases, the results being sometimes good and sometimes indifferent. But rest by immobilisation is a fine art at St. Luke's, and the spinal frame, devised by Dr. Pugh for juvenile cases, and slightly modified by Dr. Oakden for use with adults, is a remarkably ingenious contrivance on which the patient can be left for a month without disturbance and without fear of bedsores and other calamities. It is suitable with slight modifications for hip as well as for spine cases, and among its many merits are its non-retention of crumbs, sweets, and the like, so productive of sore backs, and the facility with which it allows the use of the bed-pan. Abscesses that do not subside with immobilisation are aspirated, while sinuses are injected with bismuth-iodoform paste after the removal of existing sequestra by operation. It is not the practice to leave sequestra to the expulsive and curative action of heliotherapy alone. The treatment of lupus consists in scraping and cauterising with such agents as carbolic acid, acid nitrate of mercury, or fuming nitric acid. The metal of which spinal braces and other splints are made is "duralumin," which is remarkably light and strong.

Plaster immobilisation is also practised, but the celluloid jacket or splint is not favoured for various reasons, such as the lengthy process of production, the cramping of certain necessary movements which it entails, and the sometimes undesirable warmth it gives. The hospital is equipped with a well-stocked dispensary, but it is seldom found necessary to give patients drugs. The diet is ample, plain, and nutritious; there are four meals a day, and snacks between meals as well as stuffing patients with extra eggs, and that sloppy nutriment known as milk, are not encouraged. The operating theatre is well equipped, 100 candle-power lamps being placed so as to give the operator excellent illumination. It is, however, seldom necessary to operate on cases coming under treatment at an early stage. Excision of a knee or other joint is performed where ankylosis is a moral certainty and time can therefore be gained in the period of treatment. It is the opinion of Dr. Oakden that in some cases early operation defeats its object, better results being obtained by waiting until the general condition of the patient has improved by some weeks' residence in hospital away from London. Bier's treatment by passive congestion is not practised at St. Luke's. It is perhaps inevitable that some of the cases sent to St. Luke's with the diagnosis of tuberculous cervical adenitis should be found to have carious teeth, and in this connexion it should be noted that a Lowestoft dental surgeon attends regularly.

Psychic Factor.

There is much to be said in favour of a hospital which is not built as such, but is adapted from a private mansion or hotel. Beautifully carved oak and mahogany may doubtless be accused of harbouring dust and germs, but at least it does not harbour that chilling spirit that lurks in the bevellings of the sanitary architect. In a chronic disease like tuberculosis the psychic factor is most important, and the patient who enters St. Luke's is persuaded by his surroundings to feel himself the inmate of a first-class hotel and not of an isolation hospital. And were not the subjects of tuberculosis promised first-class hotel accommodation when the Insurance Act was born? St. Luke's Hospital is proof positive that politicians are sometimes able to carry out their intentions.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

The Increased Mortality-rate in Hungary.

THE Central Statistical Bureau of Hungary has just published the figures relating to the rate of population in the year 1922. The importance of these figures lies in the fact that they reflect the situation prevalent in the country for the last three years; the consequences of a lost war and the unblessed litigations following it. The births are seemingly at a standstill, whereas the mortality-rate has increased over the already large figure for the previous year. Amelioration of this state of affairs is the urgent duty of the Supreme Sanitary Council. The Council does not attribute the unfavourable death-rate to bad hygienic conditions, but rather to the adverse economical position of the land. The total number of marriages in 1922 was 83,372—that is, 4717 less than in the previous year. There were born 220,898 living children against 211,697 of the preceding year, an increase of 1·2 per 1000 of the population, but the number of births is not at all satisfactory. The slight rise is destroyed by the higher death-rate. In the year 1921 there were 146,485 deaths, while in 1922 there were 154,857. The ratio per 1000 rose from 18 to 19·6. The number of deaths due to infectious diseases is remarkable. Tuberculosis claimed first place with 19,057 cases, the mortality-rate being 2·41. Measles and scarlet fever caused the death of 6225 children compared with 2620 in 1921. The infant mortality-rate is still on the increase; in 1922 it was 195 per 1000 live births. The increase of population arising out of the difference of births and deaths amounted in 1922 to 69,743, or 8·5 per 1000 inhabitants; this corresponds to an improvement of 0·2 per 1000 in comparison with the previous year. During last year there were 1469 emigrants, mainly to the United States of America, while immigrants numbered 1802.

A New Factor in the Ætiology of Ectopic Gestation.

Dr. Alexander Gross writes in the *Orvosok Lapja* that the evident widespread avoidance of pregnancy in married women may be attributed with some justice to the economical crisis following the war, and the severity of the struggle for life. It was formerly a common occurrence for wives with large families to seek the advice of doctors regarding the different contraceptive methods and drugs, but it now often happens that young engaged girls come to doctors for advice how to be childproof in their ensuing marriage. At present one of the contraceptive methods in vogue is the intra-uterine injection of iodine. The wives are "demanding" this, says Dr. Gross, if their menstrual period is even a few days overdue. This procedure may be injurious. Laszló, a Hungarian, has called attention to the fact that iodine injections occupy an important place in the ætiology of ectopic gestation. Who can tell the position of the fecundated ovum—if it is fecundated at all—at this stage of development? A prophylactic iodine injection may cause the ovum to adhere at an irregular situation and thus bring about a dangerous condition. Dr. Gross explains this as follows: (*a*) The effect of the iodine is to produce inflammation and thickening of the mucous membrane of the uterus and consequently of the ostium uterinum of the Fallopian tube, which is normally of 1 mm. diameter.

The ostium contracts, and thus the ovum, which is of 1 mm. diameter when it reaches the ostium, cannot get into the uterine cavity, and is obliged to settle in the tube. (*b*) With the iodine injections a part of the iodine gets into the tube and causes an endosalpingitis catarrhalis, and this, according to Fränkel, stays the migration of the ovum without retarding its development, thereby favouring the embedding of the ovum in the tube. He quotes several cases of his own, in which the occurrence of ectopic gestation could be brought in ætiological connexion with intra-uterine iodine injections. Moreover, the presence of iodine in the tube can give rise to serious abdominal consequences.

New Order of Examinations in the Medical Faculty.

The official journal of Hungary contains the order relating to the alterations in the scheme of the examinations to be passed by medical students. In order to get a medical diploma the candidate will have to pass four examinations instead of three, as at present, and as the first examination will be divided into two halves there will be, in effect, five examinations necessary. One-half of the first examination (physics and chemistry) must be passed at the end of the second session; the second half (anatomy and physiology) at the end of the fourth session. A candidate who fails in the first part may sit again in the first month of the third session; if failing again, then at the end of the fourth session. Re-entry for the second part of the examination is allowed only at the beginning of the fifth session. The second examination must be taken as hitherto at the end of the tenth session—that is, if the student has received the absolutorium (a certificate of having attended all subjects for the prescribed period of at least ten sessions). This examination, written and oral, will be easier than previously, as it will consist of general pathology, pharmacology, and pathological anatomy only. In the third, or final, examination the order of subjects has not been altered. There are two parts: the first embraces all practical work and the second consists of forensic medicine and public hygiene. The new regulations embody several useful innovations, and the division of the examinations makes them less of a strain. On the other hand, by spacing the intervals between the examinations the period of study has been extended by one full year.

BOGUS MEDICINE IN THE UNITED STATES:

THE VALUE OF HONEST JOURNALISM.

(FROM AN OCCASIONAL CORRESPONDENT.)

IT has been publicly stated that no less than six medical boards grant licences to practise medicine in the State of Connecticut.[1] One of these boards is composed of eclectic doctors who are authorised to give diplomas to those who wish to practise along these lines. Last summer the State Commissioner of Health began to investigate some of the licences granted by this board with the result that 53 of them were withdrawn. The State legislature thereupon passed a Bill to make the licences valid again, but the Bill was vetoed by the Governor of the State. The movement for reform, started by the *New York Evening Post*, I believe, seemed to be leading nowhere. There the matter might have rested but for the enterprise of a reporter on the St. Louis *Star* in Missouri. This gentleman was supplied with money by his enterprising journal, and by the judicious use of $3000, and after 2 hours and 22 minutes of intensive study, he was soon able to report that he had obtained (1) a certificate stating that he had completed his high school course in Missouri, (2) a document granting him the degree M.D. of a university that has been extinct for five years, (3) a diploma attesting the degree of doctor of chiropractic, and (4) a licence to practise medicine in Tennessee. The ingenious and humorous journalist thus let in a flood of light upon the secret organisation of the diploma manufactures of the United States.

Briefly, the procedure was to forge a diploma from some third-rate medical college in the State wherein their customer desired to practise. If it were the diploma of some college, which through the educational propaganda of the A.M.A. had been obliged to close down, that was so much the better. In the event that no such college existed in the desired State, then a licence to practise in some other State must be obtained whence by reciprocity the same end could be achieved. Thus it came about that Arkansas and Connecticut were particularly useful. In Connecticut it was necessary for the applicant to pass the State examinations. Sometimes this was arranged by proxy, at other times an examiner could be induced to pass out the questions beforehand, and the little group of aspiring "physicians" would spend an evening memorising the correct answers.

The immediate effect of this exposé has been the reviewing of licences. Eighteen eclectic doctors, in addition to those already deprived of their deceitful status, and some of them had been practising as long as nine years, have now lost their licences in Connecticut. Missouri has decided to review the licences of the 6000 physicians practising in that State, and in New York city a survey is being made of the educational history of all hospital internes. But the final results are likely to be still more important, for the wide publicity given to this scandal by the lay press has aroused public opinion all over the country. The *Survey* (Dec. 15th, 1923) forecasts a special session of the Connecticut legislature to revise the Medical Practice Act. If this revision is brought about, as it almost certainly will be, and certain other States also fall into line, a very valuable advance in American medical standards will be accomplished.

I know that the existence of this scandal has for years been perfectly familiar to your readers, but the array of sound journalistic opinion on the side of right bids fair to introduce reform.

[1] Laws and Board Rulings, published by the A.M.A. and revised to July, 1923, lists three boards—viz., regular, homœopathic, and eclectic.

SOUTH AFRICA.

(FROM A CORRESPONDENT.)

The Responsibility for a Swab Left in a Patient.

JUDGMENT was given recently at the Queenstown Circuit Court, Cape Province, by Mr. Justice van der Riet, in a case in which the plaintiff, Gwendoline van Wyk, sought to recover the sum of £2000 from Dr. Harry Lewis, of Queenstown, for alleged negligence in leaving a swab in her abdomen after an operation. She sued in forma pauperis, and was represented by Mr. Advocate Pienaar, of the Capetown Bar. Mr. Advocate Lewis, K.C., and Mr. F. B. van der Riet appeared for Dr. Lewis. The plaintiff alleged in her declaration that at Queenstown Hospital, on Feb. 3rd, the defendant operated upon her; that he carelessly and negligently left a swab within her body; that on divers occasions subsequently he examined her, but failed to detect and remove the swab; that it remained till Feb. 15th; and that, owing to its presence, she had suffered great bodily pain and anxiety, and had been put to considerable expense. Mr. Justice van der Riet gave judgment for the defendant. He found that, although the swab was left in the body, Dr. Lewis was not guilty of any negligence, and that he was entitled to relegate the duty of checking the number of swabs to the theatre sister.

Transvaal: Resignation of Dr. C. L. Leipoldt.

The Transvaal has suffered a serious loss by the resignation of Dr. C. L. Leipoldt, medical inspector of schools for the province. Dr. Leipoldt's resignation for private reasons was not unexpected, but it will be difficult to replace him. He was formerly an assistant

medical officer under the London County Council, which he left to become the pioneer of school hygiene in South Africa. He organised here a scheme of medical inspection and treatment which has served not only for the Transvaal, but as a model for South Africa as a whole, and his work on hookworm disease is now a classic. Dr. Leipoldt's energy and enthusiasm in any work he undertakes are boundless, and doubtless more will be heard of him.

The department has sustained a severe loss, too, in the death of Dr. Anne F. Cleaver, little more than a year ago. Dr. Leipoldt puts on record in his last report his appreciation of the good work she accomplished. A representative committee has been formed for the purpose of perpetuating her memory by the establishment of a university scholarship to be called the Anne Cleaver Memorial Scholarship, and by the erection of a mural tablet in the Johannesburg School Clinic, "where she worked so effectively, and which she was largely instrumental in establishing."

Medical Council Conference at Johannesburg.

A South African Medical Council Conference, dealing with the uniform training of nurses and midwives in the Union, was opened at Johannesburg on Dec. 3rd, 1923. The Cape Medical Council was represented by Drs. Darley-Hartley, F. C. Willmot, and Barnard Fuller; the Free State by Dr. G. D. de Kock; Natal by Dr. W. Russell Strapp; and the Transvaal by Drs. W. T. F. Davies, J. van Niekerk, A. H. Watt, and R. P. Mackenzie. The South African Nurses' Association was represented by Dr. John Tremble and Miss B. G. Alexander, general secretary, who acted as delegates in an advisory capacity.

A Medical School for South African Natives.

A proposal has been formulated for the institution in the near future of a medical school for native students at Fort Hare. The idea is that preliminary education in the fundamental sciences will be given for two years, to be followed by a three years' course in clinical work in the Durban coloured hospital.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

An Inquiry into the Medical Services in the Free State.

IT is announced that the Minister of Finance has decided to appoint, in the present year, a committee of inquiry into the working of the Health Insurance Acts in the Free State, and that such inquiry will include the question of the medical services generally, as well as in their relation to the medical treatment of the insured people and their dependents. Such a step has been urgently needed since the establishment of the Free State Government. In 1920 the Irish Public Health Council drew up a radical scheme of reform for the medical services of the country, including the provision for the treatment of the insured. No action was taken on it by the then Government, but the first Dail, and more recently the Free State Government have encouraged some of the changes recommended by the Irish Public Health Council, but the changes have been adopted in a piecemeal fashion. It is difficult to say whether more confusion than order has not resulted from these reforms. It is to be hoped that the committee of inquiry will be a representative and capable body in which the profession and the public can have confidence, and that it will tackle its work with courage.

National Health Certification.

The Irish Medical Committee was warned a few weeks ago by the National Health Insurance Commission that, the Government having declined to make any further grant for certification purposes after the end of 1923, it would be impossible to provide remuneration on the same scale as hitherto. The Chairman of the Commission has now submitted to the Irish Medical Committee a memorandum, in which he sketches the history of the special grant, and outlines the proposals of the Commission for the future. He states that, in 1915, after a prolonged controversy, the British Treasury agreed to make a grant not exceeding 2*s.* 6*d.* per insured member for the purpose of defraying the cost of certification in Ireland. The maximum grant for any area was limited to 2*s.* 6*d.*, and a scheme was prepared which provided for three rates of capitation, varying from 2*s.* 6*d.* in the most scattered rural areas to 1*s.* 3*d.* in urban areas. These rates came into operation in the beginning of 1916, and continued until Jan. 1st, 1920, when an increase of 40 per cent. was approved owing to the increased cost of living. In 1922 half of the increase was taken off, and since January, 1922, the capitation rate has stood at 20 per cent. over the original figures. Early in 1922, with the disappearance of the Treasury grant in Great Britain, the special grant in the Free State would also naturally have disappeared. The Insurance Commission, however, felt that a very serious position would arise if the cost of certification was placed on the funds of approved societies, owing to the fact that political troubles had caused a considerable amount of non-compliance as regards stamping. The Commissioners approached the Government, and, as a result of their representations, the grant was continued for the years 1922 and 1923.

The Proposed Capitation Fee for 1924.

The assent of the Government was given on the condition that no further grant would be asked for, and that before the end of 1923 arrangements would be made to provide the cost of certification otherwise than by a State grant. In these circumstances the Commission took the advice of the Chief Government Actuary as to how far it would be safe to draw on the benefit funds of the societies. In his report, which is quoted by the Commission, the actuary states definitely that the benefit funds could not safely be touched at all for this purpose, and he gives his reasons why the problem in Ireland differs from that of Great Britain. He suggests, however, certain other subsidiary funds from which some monies could be taken. In addition to the sources suggested by the actuary, the Commission is willing to ask for legislative authority to transfer other monies temporarily at their disposal, which would make up in all a sum equal to the product of a rate of 2*s.* on the average per insured person, and which would be devoted to the cost of certification in the Free State. The net proposal, as far as the medical profession is concerned, is that the profession is asked to accept a reduction of 3*d.* in the average capitation rate, it being proposed at the same time to take 5*d.* off the administration expenses of the societies. The proposal is confined to the year 1924, and the Commission hopes that the profession will accept the offer now put forward, and prevent a deadlock arising as to the provision of certification for the current year.

The late Sir John Walton Browne.

The death of Sir J. Walton Browne, which was announced in your last issue, has caused very deep regret to a wide circle of friends in Belfast, both among the medical profession and the general public. Sir Walton Browne filled many posts of honour in the gift of his professional brethren. In 1913 the honour of Deputy Lieutenant was conferred upon him by Lord Pirrie, K.P., and when in 1921 he received his knighthood, it was felt by all his many friends as a well-merited recognition of his services. He enjoyed great popularity among his medical brethren in Belfast, to whom his genial and kindly character, which was not obscured by an occasional brusqueness of manner, endeared him in a high degree. No less high was his repute as a surgeon, especially in the branch of ophthalmic surgery. He had the gift of friendship, and was never more at home than at the social board, public and private. His presence radiated good fellowship and hearty enjoyment. He was also much beloved by his patients, and by his subordinates in the various hospitals with which he was connected.

Sir Walton Browne was twice married. By his first wife he had a son, the late Dr. James Browne, who died some years ago. By his second wife, who died two years ago, he had a daughter who is now the wife of Colonel Young. The funeral took place on Dec. 22nd, when the large and representative gathering bore witness to the esteem in which he was held.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

The Glasgow Western Infirmary.

THE annual Christmas meeting of the infirmary was held in the Dispensary Hall on Dec. 24th last. Colonel J. A. Roxburgh, the chairman of directors, in outlining the work of the past year, said that every bed had been occupied for practically the whole period, nor was the waiting list reduced. He referred to the absence from teaching work of Sir William Macewen, now in Australia, and of Sir Kennedy Dalziel, incapacitated by illness. The training of nurses under Miss Gregory Smith had been further facilitated by the addition of a lecture-room and a study-room, and the number of pupils in the massage department had been maintained. Reference was also made to the use of insulin in the medical wards, and it was pointed out that these patients were more costly to maintain than the average. It had been possible to reduce the ordinary expenditure for the year by about £3000, but there had been a falling off in the amount of subscriptions, partly as a result of unemployment, so that the deficit for the present year would not be less than for the preceding one (£13,000). During the year the endowment fund had been increased by £22,500, and there were now 82 beds permanently endowed in the infirmary. The legacy received last year from the trustees of the late Mr. Alex. Elder had been used for an extension to the nurses' home, now nearly completed, a nurses' study and lecture-room, now completed, and a memorial chapel to Mr. Elder, which would be finished next year. Colonel Roxburgh also referred to the experiment which is now being tried in the McAlpine Nursing Home, Glasgow, of offering accommodation at reduced rates to those whose income is limited, and hoped that this innovation would lessen the long waiting list of the infirmary. On the other hand, subscriptions to the infirmary from this type of patient had last year totalled £1722. Lady Blythswood then presented the nursing prizes gained during the year. During the meeting Colonel D. J. Mackintosh, the medical superintendent, was informed that another bed had been endowed in the hospital.

Medical Demonstrations for Practitioners.

The Glasgow North-Eastern Division of the British Medical Association have arranged a short series of demonstrations during the present winter to which all the medical practitioners in the area are invited. The first of the series was held on Dec. 12th, when a demonstration was given in the orthopædic department of the Western Infirmary, Glasgow. After a brief statement on the work of the department and on the course of training received by the students of massage, practical illustrations were given of the various methods of treatment, including massage, medical gymnastics, and electrical treatment. A number of patients were shown illustrating the types of cases suitable for the various forms of treatment. About 50 members were present, and the demonstration was much enjoyed.

Hospital Extension.

At a meeting of the Campbell Hospital Board at Portsoy, Banffshire, on Dec. 27th, the question of providing an observation ward at the hospital was discussed. A proposal for a discharging ward was also brought forward. Although the hospital provided ample accommodation for zymotic diseases arising in the neighbouring districts, many cases were admitted where an immediate diagnosis was quite impossible; such cases required investigation, and should be kept in an observation ward until an accurate diagnosis could be made. As regards a discharging ward, it was noted that certain cases of scarlet fever took a considerable time before they were free from infection. The board decided to adopt the principle of observation and discharging wards, and agreed to engage Mr. McCallum, architect, of Cullen, to prepare plans and estimates for the new wards and to report to a special meeting of the board.

At a meeting of the Kingseat Mental Hospital, Aberdeenshire, on Dec. 27th, a communication was submitted from the General Board of Control, Edinburgh, approving of the proposed extension of the hospital. It was agreed to instruct the architect to prepare plans and estimates for two new villas and also an addition to the nurses' home.

Correspondence.

"Audi alteram partem."

ON SOME USES OF DIGITALIS.

To the Editor of THE LANCET.

SIR,—On the above subject (THE LANCET, Dec. 22nd, 1923, p. 1376) Dr. Harrington Sainsbury's confession of faith may be summed up as follows: "I believe in drugs which will act directly and beneficially on the cardiac power of contraction." He is prepared with reasons for his faith, but has not grasped quite clearly all that is conveyed by his dogma. Pharmacologists teach that the action of digitalis on the heart is twofold, being indirect through the medium of nerves (the vagus), and direct through its action on the contractile tissues. Clinicians, on the other hand, while recognising the therapeutic effect of digitalis through the nervous system, are divided in opinion as to the existence of any direct and beneficial action on the contractile tissues of the heart. All are agreed as to the indirect influence of digitalis on the heart through the nervous system, and the only point of difference is as to the direct and beneficial action of digitalis—or any other so-called heart stimulant—on the cardiac contractile tissues.

In giving reasons for his belief, Dr. Sainsbury deals first of all with physiological conditions under which the heart is constantly receiving through the nervous system stimuli from all parts of the body, which regulate its action. He describes these stimuli as "influencing directly the muscle fibres of the heart." Yet by his own showing the action is indirect and not direct, for the stimuli act through the nervous system and not directly on the heart. He next instances the case of a fainting subject revived by the application of strong ammonia to his nostrils. Here he says "the powerful stimulus of the ammonia has been projected from the mucous membrane of the nasal cavities, via the central nervous system, upon the heart." This is another example of reflex and not of direct action on the heart. Supposing the reviving patient uttered a cry, would Dr. Sainsbury say that therefore ammonia had a direct effect on the muscles of the vocal cords? Possibly the patient might use a swear word. Would Dr. Sainsbury then say that ammonia was a direct stimulant of bad language or the centre regulating such?

Leaving his clinical studies, Dr. Sainsbury next descends to the pharmacological laboratory for further proofs. Now let us grant him all the laboratory proof he wants. Let us grant that in laboratory experiments on the hearts of healthy animals, perfused or otherwise, digitalis has been shown to have a direct action on cardiac muscle, making it contract more and more firmly, until it finally stops in a state of tonic contraction—poisoned by digitalis. Were Dr. Sainsbury a pharmacologist only no harm would be done, but he is also a distinguished physician,

and the saddening thing is to see a clinician accepting the results of laboratory experiments as applicable to the treatment of diseased persons, without any attempt to test them carefully at the bedside. The assumption that laboratory experiments with drugs are sufficient to settle the question of their action and suitability in diseased conditions has probably led to more therapeutic failures than any other fallacy in medicine. No laboratory experiments could ever have taught us the action of digitalis in auricular fibrillation resulting from heart disease, because the same conditions do not exist in animals experimented on. To prevent misunderstanding, let me add that no one appreciates the value of pharmacological work in the laboratory more than myself.

Dr. Sainsbury completes his evidence by a reference to a recent paper by Dr. Bodon, of Budapest, on the Intracardiac Injection of Adrenalin. Dr. Bodon has had one case thus treated, but in foreign literature he finds references to 90 other cases. Prof. Velden has treated half of these—45 in all—and none of his patients lived more than eight hours after the injection. Whether this settles the question of direct action on the heart muscle or not must be left to Dr. Sainsbury, but the second part of his dogma—the beneficial action on the heart—is not left in much doubt.

Dr. Sainsbury is more provocative when he accuses the present writer of not having done justice to the facts of the case, or to the memory of past observers. He seems hurt that no reference was made to the knowledge of the type of case suitable for digitalis possessed by our teachers of 40 to 50 years ago. Why, Sir, it was known 150 years ago! Dr. William Withering, the father of digitalis therapy, wrote in 1785 as follows: "If the pulse be feeble or intermitting, the countenance pale, the lips livid, the skin cold, the swollen belly soft and fluctuating, or the anasarcous limbs readily pitting under the pressure of the finger, we may expect the diuretic effects (of digitalis) to follow in a kindly manner." Whether we call it 50 years or 150 years Dr. Sainsbury can see no sign of progress. Of this I am certain, that were Dr. Withering alive to-day he would acknowledge and welcome, as I do, the great advances in our knowledge of digitalis therapy made by Sir James Mackenzie and his co-workers. It is no injustice to the past to lay stress at times on the advances of the present. We are not a boasting nation, but English medicine is entitled to claim that Sir James Mackenzie has taught us something that was not known 40 to 50 years ago, else his name had not been honoured and his writings had not been studied in every part of the civilised world as they are.

I am, Sir, yours faithfully,

G. A. SUTHERLAND.

Wimpole-street, W., Dec. 24th, 1923.

OPIUM IN CARDIAC DYSPNŒA.

To the Editor of THE LANCET.

SIR,—I much regret if I have done an injustice to Sir Clifford Allbutt (THE LANCET, Dec. 29th, 1923, p. 1422) or to the authorities he quotes; yet I cannot but congratulate myself that a mistake of mine should have provided Sir Clifford Allbutt with an opportunity of emphasising my point in a way which no words of mine could have done, while at the same time reminding the profession of his classic contribution to the *Practitioner* of 1869. I regret that I do not possess a copy, but my recollection of it is that of an original and valuable advocacy of "morphia" hypodermically—and as distinguished from opium—in various forms of cardiac distress, with a note near the end upon dyspnœa; but I do not recollect that special reference was made to the violent paroxysms I referred to as cardiac asthma. The *St. George's Hospital Gazette* for 1909, I am sorry to say, I have not seen.

Had I been less intent on compressing my paper into a small space I should have recorded, at any rate, some of the references I discovered, and explained why few, if any, of them seemed quite to meet my experience in the use of opium (morphine, omnopon, and nepenthe hypodermically seem equally efficacious), in Cheyne-Stokes respiration, and cardiac asthma. Further, I should have explained why several eminent authorities who were good enough to read my paper before it was completed, and but for whose encouragement it would never have been written, considered that the cases recorded struck a note which might be useful both scientifically and clinically at the present juncture, when this use of opium does not appear to be generally recognised—three points, all of which were endorsed in the discussion that followed the reading of the paper.

But I have no wish to claim priority, and offer my sincere apologies to all to whom I may have unwittingly done an injustice, and specially to Sir Clifford Allbutt, to whose pioneer work in this, as in so many fields of medicine, I, in common with the rest of the profession, owe so much. On one point, however, raised by Sir Clifford Allbutt's letter I should like to express a view. "Cardiac dyspnœa" is a large subject which may be subdivided; and opium (or morphine) is, in my experience, chiefly of value in the paroxysmal forms which have but little reference to immediate effort. To one of these forms the term "cardiac asthma" has always seemed to me to be appropriate. It suggests a definite and familiar clinical syndrome which seems to require a designation. "Cardiac dyspnœa" includes much more, while "paroxysmal cardiac dyspnœa" is needlessly long, fails to suggest the violence of the seizure, and includes the major phases of Cheyne-Stokes breathing. Though there may be good reasons for insisting that the word "asthma" shall be confined to "a totally different clinical series," the term "cardiac asthma" has been adopted by Mackenzie and by other cardiologists, and is finding its way into the indices of the more recent text-books. It is convenient, everyone knows what it means, and, whether it is right or wrong, I think it has come to stay.

I am, Sir, yours faithfully,

Tunbridge Wells, Dec. 29th, 1923. CLAUDE WILSON.

AUTO-PYO-THERAPY.

To the Editor of THE LANCET.

SIR,—I could not give a summary of my investigations into auto-pyo-therapy [1] better than that which appeared in THE LANCET of Sept. 29th (p. 660), but I should like to add a few words to indicate the significance which I myself attach to these observations. Not only in the article with which you dealt but also in my first paper (German Assoc. of Surgery, 1922; see Arch. f. klin. Chir. Kongressband, 1922, 121, p. 33) I laid stress on the fact that the importance of my findings lay not in the practical successes (the knife is a very good remedy for suppurations) but in the two theoretical inferences: (1) that subcutaneous injections of untreated "native" pus containing virulent germs cause no progressive infiltration, phlegmon, or sepsis in the same patient; (2) that an established purulent process *can be healed* by such injections without any operative opening of the focus. The old advice "ubi pus, ibi evacua" expressed dogmatically the idea that pus must be the noxious principle of inflammation, and that complete and rapid evacuation was therefore the only real treatment. But practice showed that the application of this axiom could lead us astray; for instance, the much-discussed treatment of peritonitis by large "heroic" laparotomies, cross-incisions (Israel), &c., had very bad results, and supporters of "closed" treatment of peritonitis increase from day to day. Early thoracotomy in empyema carries a notorious risk; Renaud affirms that only such patients recover whose illness was recognised late, so that operation was retarded. Even nowadays the advisability of radical operation in acute osteomyelitis is problematical, being denied

[1] Deut. med. Wochenschrift, August 31st, 1923.

by many authors. The fact becomes increasingly accepted that a kind of preparatory process of the organism must occur in our work. But it is also well known that sometimes *perfect healing* can result from the action of the organism itself. Big peri-appendicular abscesses can be healed without incision or perforation so perfectly that hardly any trace is found on the occasion of a secondary appendectomy. It was my purpose to activate and increase these powers in every case of purulent inflammation. I sought a stimulus or protoplasm activator which might surpass other vaccine treatments as regards the specialty, the intensity, and the multifariousness of its effect, and I think I have found it in the pus itself. In the pus there are found the material and products both of the bacteria and of the cells of the body. The results obtained in my own cases were very good, but I yield to no one in my desire for thorough re-examinations, rigorous choice of cases, and strict indications. For the present I wish this method to be neither a substitute nor a successor to the old, well-proved surgical treatment.

I am, Sir, yours faithfully,

Budapest, Dec. 15th, 1923. DR. ENDRE MAKAI.

HAD OLIVER GOLDSMITH A MEDICAL DEGREE?

To the Editor of THE LANCET.

SIR,—Where Goldsmith graduated as a bachelor in medicine has long been in dispute, but that dispute cannot be settled by the statement of Mr. Justice Samuels in the note on pages 75–76 of his interesting work, "The Early Life, Correspondence, and Writings of the Rt. Hon. Edmund Burke, LL.D." (Cambridge, 1923). In the note referred to Mr. Justice Samuels says: "Goldsmith's medical degree was not, as has been the tradition, obtained at Leyden or Louvain, but at Dublin, where the degree of bachelor of medicine was granted to him, and that Oxford conferred the M.B. *ad eundem* on him on February 17, 1769." The evidence in support of this statement is contained in the following extract from *Jackson's Oxford Journal* for Saturday, Feb. 18th, 1769. "Yesterday Oliver Goldsmith, Esqr., Bachelor of Physic of the University of Dublin, author of 'The Traveller a Poem,' of 'The Present State of Polite Learning in Europe,' and several other learned and ingenious performances, was admitted in Congregation to the same Degree in this University."

Goldsmith entered Trinity College, Dublin, on June 11th, 1745, and he graduated Bachelor in Arts on Feb. 27th, 1749, so that according to the Statutes of the University he would not be eligible for a degree in medicine till 1752. In the latter part of that year Goldsmith left Ireland and entered on the study of medicine in the University of Edinburgh, and two years later he went abroad to complete his education. The first time that Goldsmith is recorded as having described himself as M.B. is on March 31st, 1763, in an agreement, written in his own hand, with James Dodsley. In the interval between his setting out for Edinburgh in the autumn of 1752 and March 31st, 1763, there is no evidence that Goldsmith was in Dublin, and consequently, if he was examined for the degree of M.B. in the University of Dublin, that examination must have been in the year 1752. At that time the examinations for medical degrees in the University were conducted by the College of Physicians, and the names of those examined are recorded in the minutes of that College. In neither the minutes of the College of Physicians nor in those of the Board of Trinity College is there any reference to such an examination of Goldsmith.

If Goldsmith were admitted M.B. by the University of Dublin between 1753 and 1763, that degree must have been conferred in absentia, and without previous examination. On Feb. 5th, 1761, the President and Fellows of the College of Physicians declined to take any further part in the examination of candidates for the medical degrees of the University of Dublin, on the ground that the Board of Trinity College had admitted a person to the degrees of M.B. and M.D. though the College of Physicians had refused to examine him. Had the Board granted a degree in absentia and without examination to Oliver Goldsmith, that fact would probably have been mentioned to strengthen the case of the College of Physicians, but it was not. On May 16th, 1761, the Board of Trinity College unanimously resolved "That a previous examination of the candidates for degrees in medicine is absolutely essential," and, in consequence of the attitude of the Fellows of the College of Physicians, that "The Prælectors in Chymistry and Anatomy, together with the Professor of Medicine," were to conduct the examinations. The Prælector in Anatomy, Dr. Robert Robinson, who, as a Fellow of the College of Physicians, refused to take part in the examinations, was on June 29th dismissed from the office. In view of this resolution it is unlikely that the Board of Trinity College would have admitted, in absentia and without examination, Oliver Goldsmith to the degree of M.B. during the interval between 1761 and March 31st, 1763. It is, of course, possible that this was done, but it is unlikely, and without further evidence in support of it the case for Goldsmith's medical degree in the University of Dublin must be regarded as not proven.

I am, Sir, yours faithfully,

T. PERCY C. KIRKPATRICK,
Registrar, Royal College of Physicians of Ireland.

Dublin, Dec. 23rd, 1923.

WHITE MEN AND WORK IN THE TROPICS.

To the Editor of THE LANCET.

SIR,—In the *Archiv für Schiffs- und Tropen-Hygiene* (vol. xxvii., 5, p. 177) Dr. H. W. Knipping, of the Physiological Institute of the University of Hamburg, discusses the heat regulation of the human body in the tropics, inquiring whether white workmen, who suffer more often from heat-stroke than do natives, have greater difficulty than these others in adjusting themselves to tropical conditions. He shows that after numerous investigations by many men, there has been found no material difference in the heat-regulating mechanisms of these two classes, though coloured men have probably more sweat glands and larger cutaneous capillaries. The great reducer of temperature is perspiration, but that does not help as it might unless there is a sufficient current of dry enough air to evaporate the sweat secreted. As an example of the absolutely worst place in which to work in the tropics he takes a boiler-room (furnace-room, stoke-hold) in the Red Sea, and observes that there, with a temperature of 49° C. (120° F.) and a relative humidity of 88 per cent., men drank, in a four hours' watch, 5 litres, and that 2½ litres were to be evaporated through lungs and skin. Probably this means that 2½ litres of urine were passed, but that is not directly stated. To evaporate this 2½ litres, 1343 calories are claimed as necessary, and 300–400 cubic metres (10,000–14,000 cub. ft.) of air at this humidity to carry this vapour away. There was not enough air supplied, so the men's temperature rose; sometimes he found it as high as 38·8° C. (101·8° F.). Even here it was not men in good health who took care of themselves who got heat-stroke. Coloured firemen escape because they do not work so hard; they do rarely more than half a white man's task. Their modest demands on life are satisfied with less exertion. The white man trying to work in the tropics as he could and did in the temperate zone exposes himself to a great risk. Dr. Knipping reaches the conclusion that, for any climate, the maximum safe output of work is a function of the drying power of the air, in relation to the temperature of the atmosphere and its rate of movement.

A very important question in reference to colonisation is raised by this communication.

I am, Sir, yours faithfully,

R.N.

Obituary.

LAURISTON ELGIE SHAW, M.D., F.R.C.P. LOND.

Dr. L. E. Shaw, consulting physician to Guy's Hospital and to the Royal Bucks Hospital, died at his residence in Weybridge on Christmas Day last, aged 64. He was born in 1859, a son of Dr. Archibald Shaw, of St. Leonards, and received his medical education at Guy's Hospital, where he obtained the gold medal in medicine. In 1881 he obtained the M.R.C.S. Eng.; the following year he graduated in medicine at the University of London, and proceeded to the M.D. in 1883. About this time Dr. Shaw joined the staff of Guy's Hospital and rapidly won his way to promotion, throwing himself with enthusiasm into improving the organisation and teaching in the medical school. He filled the offices of curator of the museum, medical registrar, and teacher of pathology, and later was appointed lecturer in practical biology and assistant physician. In due course he became full physician and lecturer on medicine, posts which he held until his resignation in 1919. He also held office as Dean of the Medical School of Guy's Hospital and was for a time assistant physician at the City of London Chest Hospital.

As a teacher Dr. Shaw was very popular; students greatly appreciated the trouble he took with them, and many owe a sound knowledge of clinical medicine to him. He had a way of bringing out the essential feature of any case, and he not only taught from his own knowledge but criticised the current doctrines fairly, so as to prevent his listeners from pursuing will-o'-the-wisps; he stimulated discussion among those at the bedside and would often ask one of his colleagues to come and discuss a difficult case with him before an assemblage of students. With the help of his friend, Sir Cooper Perry, he wrote a long paper in the Guy's Hospital *Reports* on diseases of the duodenum, which contained the experience of Guy's Hospital ever since post-mortem records had been kept—a paper which has become classical.

Lauriston Shaw became keenly interested in medical politics at an early stage of his career, and associated himself with the British Medical Association. He was elected President of the Metropolitan Counties Branch of the Association in 1911, and was for some years chairman of the Ethical Committee. He took an active part in framing the provisions of the National Health Insurance Act, and held the responsible position of treasurer of the Panel Committee for London from its inception. To this post he was unanimously re-elected year by year, until ill-health compelled his retirement, much to his own regret, in October, 1923. At the same time he resigned his membership of the London Insurance Committee, on which body he had been an appointed representative of the profession.

In appreciation of his unselfish labours for the betterment of medical administration, his colleague, Dr. H. H. Mills, writes: "I was intimately associated with Dr. Shaw during the difficult months immediately before and after the establishment of the National Insurance Act. During that stormy time he remained calm and unperturbed. He was a man of vision and high ideals, which enabled him to take an optimistic view, with never a doubt as to the ultimate success of the great experiment. His calm counsel was invaluable, and his ability in seeing the question from all points of view was remarkable. This enabled him to adjust many difficulties and to make progress even when clashing interests threatened unavoidable rupture. His statesmanlike work was invaluable, and he lived to see the undoubted success of the scheme for which he sacrificed so much."

From the time of his nomination to a seat on the Metropolitan Asylums Board by the Ministry of Health in 1915 until last summer Dr. Shaw had devoted himself unsparingly to the furtherance of the Board's work, and especially to the advancement of its medical status. His knowledge of medical subjects, combined with a capacity for rapidly marshalling facts and a remarkable facility of expression, made him an ideal chairman of the important special and medical subcommittee of the infectious hospitals section. He had a great belief in the potentiality of the Board as an educational organisation, and realised the wealth of material for teaching and research collected in its numerous and varied institutions. He was largely instrumental in instituting both the scientific advisory committee, a body of experts in various branches of medical and allied sciences nominated at the request of the Board by the Medical Research Committee, and also the subcommittee concerned with the coördination of the whole medical and nursing arrangements.

Of his personal qualities "W. H.-W." writes: "Perhaps his most obvious characteristic was his honesty. However he might differ from his colleagues in some matter of policy, they always knew that he advocated a particular course because he believed that it was the best not for himself but for the general good. Nevertheless, he recognised that others might with reason hold contrary opinions; he never got angry, and was always fair to and willing to listen to his opponents. He made an admirable chairman, in which position he exercised a sweet reasonableness and quiet humour that could convert what might have been a stormy meeting into a peaceful, harmonious, and useful discussion."

As a loyal friend, as a sound clinician, and as a man of vision his loss is a sore one to the ranks of medicine. Ever courageous, Shaw carried out his ideals fearlessly in spite of ill-health or adverse criticism, for, as he once admitted, his work in behalf of the National Health Insurance from 1911 to 1913 made him so unpopular that for a time nearly every avenue of activity was closed to him. Notwithstanding all he persevered, and his work during the last ten years in the interests of the community first and of the profession second, won him admiration and respect.

SIR LAMBERT HEPENSTAL ORMSBY, M.D. DUB., F.R.C.S.I.

Sir Lambert H. Ormsby, past President of the Royal College of Surgeons in Ireland, whose death we have already announced, was born in 1850. He had been ill for some weeks past, but had been confined to his bed for only a few days.

Lambert Ormsby, though of Irish descent, was born in Auckland, N.Z., his father, George Owen Ormsby, C.E., being surveyor-general of New Zealand. The son came to Ireland at an early age, and entering the Royal College of Surgeons as an apprentice of Mr. (later Sir) George Porter, had passed all examinations for his licence at the age of 19. Having received the licence he entered Trinity College, Dublin, and subsequently gained the medical degrees of that institution, M.B. in 1874 and M.D. in 1877. He was admitted a Fellow of the Royal College of Surgeons in Ireland in 1875. Meanwhile, at the age of 21, he was elected surgeon to the Meath Hospital, the duties of which post he continued to perform up to his death. From 1902 to 1904 he was President of the Royal College of Surgeons, and on the death of Sir Charles Cameron a few years ago he was elected honorary secretary of the College. During his tenure of office as President, in 1903, Ormsby had the honour of knighthood conferred upon him. Early in his surgical career he became interested in the diseases of children, and was for many years senior surgeon to the National Children's Hospital, Dublin, which in 1876 he had founded as the National Orthopædic and Children's Hospital. His work there is embodied in two important volumes on "Deformities of the Human Body" and on the "Diseases Peculiar to Children." His name is recorded in the history of anæsthetics by his invention of an ether inhaler, which still has its uses, though lacking the niceties of later modifications. He also invented a new form of pile clamp and an aseptic glass drainage-tube. A

description of his new form of rectal speculum was published in THE LANCET, 1905, vol. ii., p. 362. He wrote various papers on surgical subjects, and also a "History of the Meath Hospital." For many years he interested himself in public life, and was an active magistrate and Poor-law guardian. He acted as chairman of the Association for the Housing of the Very Poor in Dublin, and played a prominent part in many philanthropic movements. In 1885 he founded the Dublin Red Cross Nursing Sisters' Home and Training School for Nurses, an institution to which he devoted his constant care. He was consulting surgeon to the Drummond Military Schools, Chapelizod, and honorary consulting surgeon to the Dublin branch of the Institute of Journalists. He was also a member of the Board of Superintendence of Dublin Hospitals, and governor of the Government Lock Hospital.

Sir Lambert Ormsby was a man of strong personality. In 1906, when senior surgeon to the Meath Hospital and the County of Dublin Infirmary, he voiced the grievances of the Naval Medical Service to his students, urging them, in effect, not to enter the service in order that the authorities might be moved to remedy what he considered obvious defects in the system. Although several of his statements were challenged, a committee was formed in 1911 under Admiral Sir John Duncan to inquire into the prevailing conditions, and certain improvements resulted, including the establishment of a naval medical school. In March, 1915, he was appointed honorary consulting surgeon to the New Zealand Expeditionary Force, with the rank of Lieut.-Colonel.

His first wife, daughter of Mr. John Dickinson, died in 1911, leaving a daughter and a son, Colonel G. J. A. Ormsby, D.S.O., R.A.M.C., who distinguished himself in the war. Sir Lambert Ormsby married, secondly, in 1921, Geraldine Matthews, R.R.C., O.B.E.

SIR NAPIER BURNETT, K.B.E., M.D. GLASG., F.R.C.S. & P. EDIN.

Sir Napier Burnett, who died on Christmas Day at the age of 51 years, will be remembered as a real friend to the voluntary hospital principle. He was the youngest son of James Burnett, of Fraserburgh, and was educated at the Universities of Edinburgh and Glasgow, qualifying in medicine at the latter in 1894. He practised in Milnathort for a couple of years, after which he moved to Blackburn, where he built up a large connexion. But general practice did not satisfy him completely and he took up the study of obstetrics and gynæcology at Dublin and Manchester with a view of consulting work in Newcastle-upon-Tyne. In 1905, after taking the F.R.C.S. Edin., he joined the staff of the Women's Hospital in Newcastle and in 1911–12 he was president of the Newcastle Clinical Society, playing an active part in that society's work, especially in the founding of a journal of its Transactions. He was also an original member and part founder of the Pathological Club in Newcastle. His writings at this time included a study of obstetrics in relation to allied sciences, and papers on placenta prævia, *B. coli* infection of the urinary tract in pregnancy, and chorio-angioma of the placenta, the last in association with Prof. Stuart McDonald.

When war broke out in 1914 Burnett was already regarded as something of an authority on hospital administration, of which he had been for years a keen but friendly critic. With Prof. Rutherford Morison he organised the Northumberland War Hospital and was an active member of its surgical staff until he was called to larger things. It was a happy inspiration which led the War Office to invite Burnett to examine war hospitals as to their working efficiency, and he threw himself with much zeal into his duties as chairman of the Economic Committee of the Army Medical Department. When this came to an end he was asked by Sir Arthur Stanley to direct the Hospital Service Department of the Red Cross, which was then undertaking a survey of hospital finance and shortly after he became chief executive officer of the Joint Council, as well as adviser to the Joint War Committee on the administration of the balance of funds to ex-Service men. On behalf of the British Red Cross Society he attended the meetings at Geneva of the League of Red Cross Societies and he also represented the Government at the disposal of Red Cross stock left at Constantinople. Four annual reports on the Voluntary Hospitals in Great Britain (excluding London) issued from his pen, the last of these in July, 1923. These reports are much more than statistical summaries, they are a record of the recovery of the voluntary hospitals from the trough of depression, amounting almost to bankruptcy, in which the war left them. Burnett recognised the deepening interest of the public in the voluntary movement. It may seem strange that little in his professional life previous to the war had foreshadowed the powers which were in the man, but those who knew Burnett well had always seen him as one who touched life at many points and who brightened and quickened what he touched. No doubt among professional men there are many potential administrators whose gifts are never put to the test; the opportunity came to Burnett and did not find him wanting. His balance and persistency, his gift of sound judgment and foresight, his faculty of mastering experiences by a steady sweeping progress of comprehension brought him unerringly to his goal, while the fact that he never stooped to subterfuge or feared the judgment of his fellows brought him the respect even of those who differed from him.

In civic life Burnett was a justice of the peace for the City of Newcastle and sat regularly on the local bench. He became a member of the Newcastle City Council for St. Thomas's Ward, where he was succeeded by his friend Dr. R. W. Simpson when he left for London. In politics a Liberal, in religion a Presbyterian, his standard of public duty was high. It was in large measure his sympathy with the poor, and his acquaintance with their struggles when afflicted with illness, that induced him to work for hospital coördination and efficiency. His own bent was against State control, and while he worked unceasingly to set up sound finance and administration he always hoped that the civil hospitals might remain apart from departmental management. The success of this achievement—if indeed it has been achieved—lies largely at his door.

Sir Napier Burnett married Jane, daughter of the late George McCoull, of Ovington House, Northumberland. He is survived by his widow and four daughters, for whom great sympathy is felt at their untimely loss.

ERNEST ROCK STREETEN, M.R.C.S. ENG.

Dr. E. R. Streeten died on Dec. 17th, 1923, at Bexhill-on-Sea, aged 57 years, after a long period of ill-health. He was a student at St. George's Hospital and qualified M.R.C.S. Eng. and L.R.C.P. Lond. in 1890. After holding an appointment at the Royal India Asylum as assistant medical officer and working as locum and assistant for some time, he bought a practice in Barnsbury, London, N., and remained there for 23 years—until 1918. In that year he had a serious breakdown in health, and owing to cardiac trouble, was compelled to retire from practice. He settled in Ventnor, Isle of Wight, but removed from there to Bexhill-on-Sea early in 1923.

He leaves a widow and one son, aged 15, who is being educated at Epsom College.

A HOVE CENTENARIAN.—On Dec. 27th last Mrs. Dill, mother of Dr. John Gordon Dill, of Brunswick-square, Hove, celebrated her hundredth birthday. She is the daughter of General Sir Charles Wale, K.C.B., and granddaughter of Mr. Thomas Wale, of Little Shelford, Cambridgeshire, who was born in 1701, the three lives thus covering the span of 222 years. Mrs. Dill was married to the late Dr. Richard Dill, of Regency-square, Brighton, in 1856; there were six children of the marriage, Dr. Gordon Dill being the eldest and only surviving son.

Medical News.

UNIVERSITY OF ST. ANDREWS.—At examinations held recently the following candidates passed in the subjects indicated :—

SECOND EXAMINATION FOR DIPLOMA IN PUBLIC HEALTH.
Sanitation and Epidemiology.—James Lamberton, William L. Tullis, and Frances H. Watson.
Sanitary Law and Vital Statistics.—James Lamberton, Isobel M. Mansis, William L. Tullis, and Frances H. Watson.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated :—

Surgery.—D. Dimitrijevitch, Oxford and St. Mary's Hosp.; H. S. Edwards, St. George's Hosp.; and S. Snelson, Manchester.
Medicine.—H. J. Powell, St. Mary's Hosp.; and D. G. Robinson, Guy's and Charing Cross Hosps.
Forensic Medicine.—P. V. Casling, St. Mary's Hosp.; H. T. Chiswell, Guy's Hosp.; H. J. Powell, St. Mary's Hosp.; R. Schofield, Guy's Hosp.; and J. B. Sweet, Glasgow.
Midwifery.—F. H. Armanious, St. Thomas's Hosp.; C. J. Fox, St. Mary's Hosp.; and R. Norrie, St. Andrews University.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: D. Dimitrijevitch and C. J. Fox.

A THREE months' course of lectures and demonstrations in Hospital Administration will be given at the North-Western Hospital, Lawn-road, Hampstead, N.W. 3, by Dr. E. W. Goodall, on Mondays and Thursdays, at 4.30 P.M., and alternate Saturdays at 10.30 A.M., beginning on Jan. 7th.

DINNER TO SIR JOHN BLAND-SUTTON.—On Thursday, Jan. 24th, at 7.30 for 8 P.M., at the Hotel Victoria, Northumberland-avenue, W.C., a congratulatory dinner will be given by Middlesex Hospital colleagues and friends to Sir John Bland-Sutton, to mark the occasion of his election to the Presidency of the Royal College of Surgeons of England. Dr. W. Essex Wynter will preside.

CHELSEA CLINICAL SOCIETY.—A meeting of this Society was held in the Clubroom, St. George's Hospital, on Dec. 18th last. A discussion on the Manipulative Treatment of Joint Diseases was opened by Mr. Frank Romer, who also gave a demonstration of the methods employed by bone-setters. Dr. J. B. Mennell and Messrs. Duncan Fitzwilliams, Graeme Anderson, W. H. Trethowan, and B. Whitchurch Howell also took part in the discussion.

RONTGEN SOCIETY.—A general meeting will be held on Jan. 8th, at 8.15 P.M., in the British Institute of Radiology, 32, Welbeck-street, London, W. Dr. J. A. Crowther will read a paper on Studies in X Ray Production, and Mr. H. Moore will speak on the Quality of the X Rays Excited in Hot Cathode and in "Gas" Tubes by Various Types of Generators of High-Tension Current.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART.—A special two weeks' intensive course in cardiology will be held from Jan. 14th to 25th. In the mornings from 10 to 12.30 lectures and demonstrations will be given by Dr. B. T. Parsons-Smith, Dr. J. Strickland Goodall, Dr. John Parkinson, Dr. F. W. Price, Dr. R. O. Moon, and Sir Sydney Russell-Wells, M.P., and the afternoons will be devoted to ward demonstrations and out-patients. A selection of museum specimens, slides, &c., will be arranged in the laboratory and changed daily throughout the course. Further particulars may be obtained from the Dean, Dr. Parsons-Smith, at the hospital, Westmoreland-street, Marylebone, W. 1.

FUTURE OF LEEDS HOSPITALS.—In order to gain the interest of business and professional men in the schemes set on foot for raising more money for the maintenance of the local hospitals and other medical institutions a meeting was held on Dec. 17th at the Leeds Town Hall. Amongst other schemes the collieries in Yorkshire are to contribute on the basis of one farthing per ton of coal raised, and the miners one penny a week each; these together are calculated to realise about £15,000 a year. By other organisations of the business centre of the city it is hoped to raise £2000 a year. These sums, and much more, will be needed, as it is calculated that the deficit on this year's working of the General Infirmary will be between £25,000 and £30,000, while that on the Women's and Children's and Maternity Hospitals will be about £10,000. At the General Infirmary there is a list of 1200 to 1600 people awaiting admission for operations, and to open a new ward would cost between £4000 and £5000 a year. To-day the cost of maintaining the infirmary is £100,000 a year, and £30,000 to £35,000 to carry on the other Leeds hospitals, and for the convalescent homes between £6000 and £10,000 a year.

UNIVERSITY OF LONDON.—A course of three lectures on the Influence of Improved Town Planning and Housing in Public Health will be given by Prof. John Robertson, M.D., of Birmingham, at University College, Gower-street, W.C., on Jan. 18th, Feb. 1st and 15th, at 5 P.M. At the first lecture the chair will be taken by Prof. H. R. Kenwood. The lectures, which will be illustrated with lantern slides, are addressed to advanced students of the University and to others interested in the subject.

REMUNERATION OF INSURANCE PRACTITIONERS.—The Court of Inquiry into the remuneration of practitioners under the National Health Insurance Acts sits to-day (Friday) at the Ministry of Health, and again on Monday and Tuesday, in each case at 10.30 A.M. These meetings are open to the public and the press. The Minister of Health and the Secretary for Scotland have appointed Sir Gilbert Garnsey, K.B.E., to be a member of the Court, in succession to Sir Josiah Stamp, K.B.E., who is unable to serve owing to pressure of other business.

MAUDSLEY HOSPITAL.—The seventh course of lectures and practical courses of instruction for a diploma of psychological medicine will begin on Jan. 21st, 1924, when Sir Frederick Mott, F.R.S., will give the first of eight lectures on the Anatomy of the Nervous System at 2.30 P.M. On Jan. 24th Dr. H. Devine will start his series of eight lectures on Psychology, and on the 25th the first of eight lectures on the Physiology of the Nervous System will be delivered by Dr. F. Golla. Practical instruction and demonstrations will also be given in physiological chemistry and practical physiology. Arrangements for the second part of the course will be announced later. Further particulars may be obtained from the Director of the Pathological Laboratory, Maudsley Hospital, Denmark Hill, London, S.E.

FELLOWSHIP OF MEDICINE.—The North-East London Post-Graduate College is holding in association with the Fellowship of Medicine an intensive course at the Prince of Wales's General Hospital, Tottenham, N. 15, from Feb. 4th to 16th, 1924. It will include demonstrations of clinical methods and cases, lecture-demonstrations, and work in the general and special departments of the hospital. A special feature of the course will be the afternoon lectures at 4.30 P.M. These lectures will be free to general practitioners who are members of the North-East London Post-Graduate College, and to members of the Fellowship of Medicine. The names of the lecturers will be published later, and the complete syllabus will be available shortly. Application should be made to the Dean of the College, Mr. J. Bright Banister, 39, Harley-street, W. 1, or to the secretary to the Fellowship at the above address.

PANEL DOCTORS' £1000 PENALTY.—The report of the Ministry of Health upon the Tottington inquiry, which resulted in a fine of £1000 being imposed upon two medical men in respect of infringements of the Insurance Acts Regulations by charging fees to panel patients, came before the Lancashire Insurance Committee on Dec. 17th. A resolution was moved to request the Ministry to reduce the fine to £100, but only the mover and seconder voted for the resolution. The chairman said that the £1000 went to the Treasury.

CHINESE DOCTOR'S WELCOME IN JAPAN.—Recent signs of a rapprochement between China and Japan have included the enthusiastic welcome during his tour through Japan of Dr. Wu Lien-teh, the president of the National Medical Association of China. Dr. Wu is a Cambridge graduate, who has spent some time in France and Germany and holds many European honours. Now director and chief medical officer of the North Manchuria Plague Prevention Service, and one of the chief authorities on plague, Dr. Wu met important gatherings at Kioto, Tokyo, Osaka, and Nagasaki. At Kioto he spoke to his audience of 400 medical men and students in Mandarin, and specially urged the need in teaching centres of separating the subject of hygiene from the department of bacteriology or even pathology, on the plea that public health has become more important than the lives of individuals. He contrasted the difficulties of Eastern countries with those of Western, owing to differences in constitution and habits, and urged the need of a common standard for health matters in the East. In some centres he spoke in English, his remarks being translated into Japanese by Dr. Todyo. At the Medical Conference at Kagoshima he spoke for one and a half hours to 800 medical men, and dealt particularly with the research work done in Harbin during the past few years. He stated that he hoped that if part of the Boxer Indemnity was returned, as had been proposed, a portion of the money would be devoted to the establishment of a proper institution in China. Throughout his tour Dr. Wu was accorded a warm welcome.

DONATIONS AND BEQUESTS.—Mr. Elgin Needham, solicitor, Werneth, Oldham, by will left £1000 to the Oldham Royal Infirmary, £500 to the Oldham Mission, £400 to the Oldham Nursing Association, £300 to the Oldham Bluecoat School, and £100 to the Ellesmere (Salop) Cottage Hospital.—The late Mr. Walter Laurie, of Hawick, bequeathed £1000 to the Hawick Cottage Hospital, and £500 to the Jubilee Nursing Association. The New Year brought handsome contributions to 22 hospitals in Manchester and Salford from the Lord Mayor of Manchester Two Million Shillings Fund. The gifts ranged from £23,000 to £100, in accordance with the figures appearing in the report of the Joint Hospitals Committee. Some of the larger amounts and their allocations were: Royal Infirmary, £23,000; Children's Hospital, Pendlebury, £9854; Salford Royal Hospital, £8690; Ancoats Hospital, £6000; St. Mary's Hospital, £5355; Eye Hospital, £4743; Hospital for Consumption, £3000; Victoria Hospital, £2464; Hospital for Incurables, £2317; Northern Hospital, £2000; Dental Hospital, £1500.

WATER-SUPPLY OF HASTINGS.—Fourteen years ago, in November, 1909, the ratepayers of Hastings voiced their opposition to a Various Powers Bill to the extent of a majority of 4792 in a poll of 5908. One of the principal clauses in the Bill had reference to the safeguarding of the town's water-supply; during the summer of 1908 the consumption of water for nearly a month was in excess of that which could be obtained by day and night pumping. But the ratepayers' veto prevented anything being done. A cost of some £130,000 was then spoken of, but this sum will now greatly be exceeded in the proposed new Bill which the town council is formulating. In the years that have elapsed neighbouring bodies, both public and private, have been pegging out their watersheds, with the result that Hastings may now have to look as far away as the Eastbourne or Folkestone areas to obtain an adequate water-supply.

LIVERPOOL LOCAL MEDICAL AND PANEL COMMITTEE.—At a meeting of this Committee, held on Dec. 17th, 1923, it was resolved that:—

In view of the fact that the text of the proposed "Provisional Regulations" which become operative on the first of January next has not yet been submitted to Panel Committees, this Committee desires to enter the strongest possible protest against the present arbitrary method of imposing continued and extensive alterations to the Medical Regulations. The Committee wishes to point out that the Medical Regulations were entirely re-cast as recently as the first of January last, and that the profession is now faced with what is practically a new set of regulations. It is quite impossible for a practitioner in active practice to keep in touch with these successive alterations, and he only learns of their existence when he is summoned to appear before the Medical Service Subcommittee.

Four other paragraphs appended to the resolution affirmed the belief of the Committee that the present condition of panel practice may lead to the breakdown of the system.

ULSTER MEDICAL SOCIETY.—The annual dinner of the Society was held in the Medical Institute, Belfast, on Dec. 18th last. Prof. St. Clair Symmers presided, and 137 members and guests were present. The occasion was memorable by reason of the presence of His Grace the Governor of Northern Ireland, the Duke of Abercorn, K.P. There were also present as guests the Prime Minister of Northern Ireland, Sir James Craig; the Lord Chief Justice of Northern Ireland, Sir Denis Henry, K.C.; the Speaker of the House of Commons of Northern Ireland, Hon. Hugh O'Neill; Lord Justice Moore; the President of the Royal College of Surgeons in Ireland, Sir William Wheeler; Mr. Justice Wilson; and the President of the Northern Law Society, Mr. S. G. Crymble. In the course of the evening Sir William Whitla presented a loving cup to the Society. The function was one of the most successful and enjoyable in the history of the Society.

CHILD WELFARE WORK IN LIVERPOOL.—From funds provided by the Carnegie United Kingdom Trust, a central building has been erected to act as a coöperating unit for all agencies concerned in work for mothers and babies. It is also intended to act as a model welfare centre. It contains, besides consulting-rooms and lecture-rooms, two wards of six beds each, in order that children may be kept under observation. The site, gifted by the city, lies between the Royal Liverpool Children's Hospital and the site of the new Maternity Hospital, and should be symbolical of the new centre's work, the aim being to keep mother and child alike healthy and so prevent disease. The upkeep of the new institution falls upon the municipality, but a substantial grant will be received from the Ministry of Health. The building was declared open on Dec. 15th last by Miss Haldane, chairman of the Welfare Committee of the Carnegie Trust, who emphasised the prophylactic character of the work to be begun there in the new year, and appealed for the help of voluntary workers in the welfare movement.

THE RADIUM INSTITUTE.—Sir Malcolm Morris has been elected chairman of the Institute in the place of the late Sir Frederick Treves, and Sir Humphry Rolleston has joined the committee.

GLASGOW WESTERN INFIRMARY.—As the result of a contribution from the Hutton Malcolm Amateur Operatic Society, the Western Infirmary will be able to instal a high tension transformer for use in deep X ray therapy.

GLASGOW ROYAL HOSPITAL FOR SICK CHILDREN.—At this hospital, which comprises 270 beds, during the last year 5171 children were treated as in-patients. In the out-patient department and at the dispensary over a similar period 19,148 and 49,833 respectively were treated, while in the country branch 380 children received attention.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL.—The sixth series of post-graduate lectures to students and practitioners, at 5 P.M. on Thursdays, will be held from Jan. 10th to March 6th inclusive. On Jan. 10th Dr. T. G. Stevens will lecture on the Treatment of Labour Complicated by Generally Contracted Pelvis. On Jan. 17th Dr. C. H. Roberts will speak on Ante-Partum Hæmorrhage. On Jan. 24th Mr. Bright Banister will discuss the Late Manifestations of Puerperal Sepsis. Mr. Aleck Bourne will deal with Puerperal Insanity on Jan. 31st, and Mr. T. B. Davies with Acute Abdominal Pain in Pregnancy on Feb. 7th. On Feb. 14th Mr. L. C. Rivett will lecture on the Value of Antenatal Examination, and on Feb. 21st Mr. Clifford White on Delay in the Second Stage of Labour. Mr. L. G. Phillips will deal with Infant Feeding on Feb. 28th, and the terminal lecture on March 6th by Mr. W. Gilliatt will be on Eclampsia and its Treatment.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Jan. 8th.

MEDICINE
PATHOLOGY
THERAPEUTICS AND PHARMACOLOGY } at 4.30 P.M.

Joint Discussion:

On the Uses and Limits of Vaccine Therapy. To be opened by Sir Almroth Wright, Dr. A. P. Beddard, Sir William Leishman, Dr. W. Gordon, Dr. Norman McCaskie, Dr. R. Armstrong, and others.

MEDICINE
NEUROLOGY
OBSTETRICS AND GYNÆCOLOGY } at 8.30 P.M.
PSYCHIATRY
SURGERY

Joint Discussion:

On Post-operative and Puerperal Mental Disorders. The following will take part in the discussion: Sir Charters Symonds, Dr. James Collier, Mr. Aleck Bourne, and others.

Thursday, Jan. 10th.

NEUROLOGY: at 8 P.M. at the Hospital for Epilepsy and Paralysis, Maida Vale, W.
Clinical Meeting.

Friday, Jan. 11th.

CLINICAL: at 5.30 P.M. (Cases at 5 P.M.)
Cases will be shown.

OPHTHALMOLOGY: at 8.30 P.M. (Cases at 8 P.M.)
Cases will be shown.

Papers:

Lieut.-Colonel Herbert: A Case of Very Chronic Sympathetic Ophthalmia.

Mr. Harrison Butler: The Practical Value of the Slit Lamp.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W. 1.

FRIDAY, Jan. 11th.—8.30 P.M., Dr. Gordon Holmes will open a discussion on the Examination of the Cerebro-spinal Fluid in Relation to the Diagnosis and Treatment of Neuro-syphilis. Dr. T. Grainger Stewart, Dr. Panton, and others will continue the discussion.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W. 1.
(Lectures, Jan. 7th to 12th.)

NORTH-EASTERN FEVER HOSPITAL.

WEDNESDAY and SATURDAY.—11 A.M., Dr. Frederic Thomson: Diagnosis and Treatment of the Acute Infectious Diseases.

ST. PETER'S HOSPITAL FOR STONE.
MONDAY.—2 P.M., Mr. Andrews: Injuries of the Urinary Organs.
TUESDAY.—2 P.M., Mr. Joly: Urinary Calculi and Calculous Disease.
WEDNESDAY.—2 P.M., Mr. Morson: Tumours of the Urinary Tract.
THURSDAY.—2 P.M., Mr. F. J. F. Barrington: Non-tuberculous Infections of the Urinary Tract.
FRIDAY.—2 P.M., Sir John Thomson-Walker: Urinary Obstruction.
SATURDAY.—2 P.M., Mr. Harkness: Urethritis in the Male.

THE INFANTS HOSPITAL.
2–3.30 P.M., Clinical Demonstration each day.
MONDAY.—4 P.M., Dr. E. Pritchard: Principles of Infant Dietetics.
TUESDAY.—4 P.M., Dr. D. Paterson: Infections of the Urinary Tract.
WEDNESDAY.—4 P.M., Dr. Mackay: Cerebro-spinal Meningitis.
THURSDAY.—4 P.M., Dr. V. Denne: The Teeth of Infants.
FRIDAY.—2 P.M., Round-Table Clinical Consultation. 4 P.M., Dr. W. E. Robinson: Cough.

WEST-END HOSPITAL FOR NERVOUS DISEASES, at 73, Welbeck-street, W. 1.
MONDAY.—1.30 P.M., Dr. H. Campbell: Headache and other Sensory Disturbances.
WEDNESDAY.—5 P.M., Mr. L. Rea: The Eye in Nervous Disease.
FRIDAY.—5 P.M., Dr. C. Worster-Drought: Varieties of Neuro-syphilis.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Jan. 7th.—10 A.M., Mr. Maingot: Surgical Pathology. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards.
TUESDAY.—12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Sinclair: Surgical Out-patients. 2 P.M., Mr. Banks-Davis: Diseases of Throat, Nose, and Ear.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 2 P.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Dr. Scott Pinchin: Medical Out-patients.
FRIDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 12 noon, Mr. Endean: Venereal Diseases. 2 P.M., Mr. Sinclair: Surgical Out-patients.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

ST. MARY'S HOSPITALS, MANCHESTER, POST-GRADUATE LECTURES.
FRIDAY, Jan. 11th.—(At Whitworth-street West Branch.) 4.30 P.M., Dr. Fletcher Shaw: Some Clinical Points in Obstetrics.

UNIVERSITY OF LIVERPOOL POST-GRADUATE LECTURES. (At 3.30 P.M.)
MONDAY, Jan. 7th.—(At the Children's Hospital.) Mr. Thurstan Holland: X Ray Diagnosis.
TUESDAY.—(At the Southern Hospital.) Dr. Macalister: Intersexuality in Relation to Disease.
WEDNESDAY.—(At the Northern Hospital.) Mr. Simpson: Some Points in Abdominal Surgery.
THURSDAY.—(At the Stanley Hospital.) Mr. Courtenay Yorke: Ear, Nose and Throat Cases.
FRIDAY.—(At the Royal Infirmary.) Mr. Jeans: Urinary Surgical Cases.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL, Marylebone-road, N.W.
THURSDAY, Jan. 10th.—5 P.M., Dr. T. G. Stevens: The Treatment of Labour complicated by generally contracted pelvis.

Appointments.

BISSET, Dr. MARY, has been appointed Medical Officer for the County Council Schools at Brighton.
DUNSCOMBE, N. D., M.B., B.Ch., D.P.H. Camb., Casualty Officer at the East London Hospital for Children and Dispensary for Women, Shadwell.
GÖTHE, WERNER, M.R.C.S., L.R.C.P. Lond., Medical Officer in Charge of the Physico- and Electro-Therapeutic Department, Middlesex Hospital.

Vacancies.

For further information refer to the advertisement columns.

Barnet, Wellhouse Hospital.—Asst. Res. M.O. £150.
Dorset Mental Hospital, near Dorchester.—Deputy Med. Supt. and Pathologist. £575.
Galloway Royal Infirmary.—Jun. Res. M.O. £125.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. £50.
Hospital for Tropical Diseases, Endsleigh-gardens, N.W.—H.P. £150.
Hull, Anlaby-road Infirmary.—Visiting S. £150.
Kettering and District General Hospital.—Hon. Radiologist.
Leicester Royal Infirmary.—Second H.P. £125.
Maidstone, Kent County Mental Hospital.—Asst. M.O. £350.
Manchester, Ancoats Hospital.—Sen. Res. Surg. O. £225.
Manchester Royal Infirmary.—Second Surg. Reg. £150. H.S.'s, H.P.'s, and H.S. to Aural, &c., Depts. Each £50. Also Anæsthetist. £100.
Mount Vernon Hospital for Tuberculosis, &c.—Anæsthetist.
Nottingham Children's Hospital.—Res. H.S. £150.
Notts County Mental Hospital, Radcliffe-on-Trent.—A.M.O. £400.
Orkney, Parish of Eday.—M.O.
Oxford County and City Mental Hospital, Littlemore, near Oxford.—Second Assistant M.O. £350.
Plymouth Borough.—Port M.O. £750.
Poplar Hospital for Accidents, East India Dock-road, E.—Radiographer.
Putney Hospital, Lower Common, Putney, S.W.—Res. M.O. £150.
Queen Mary's Hospital for the East End, Stratford, E.—H.P. £150.
Royal Army Medical Corps.—Commissions.
Royal Free Hospital, Gray's Inn-road, W.C.—H.P.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Anæsthetist. £105.
St. Mary's Hospital, London, W.—Med. Supt. £400.
Sheffield Royal Hospital.—Cas. O. £150.
Sheffield, South Yorkshire Asylum.—M.O. £400.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. Each £100.
Warwick County and County Borough of Coventry Joint Mental Hospital.—Med. Supt. £1000.
West End Hospital for Nervous Diseases, 73, Welbeck-street, W.—Cas. P. £200.

Births, Marriages, and Deaths.

BIRTHS.

BRANDER.—On Dec. 28th, 1923, at Bexley, Kent, the wife of John Brander, M.D., of a son.
CUNNINGHAM.—On Dec. 28th, 1923, at Weymouth-street, W., the wife of J. F. Cunningham, O.B.E., F.R.C.S., of a son.
DONALDSON.—On Dec. 23rd, 1923, at Avenue-road, Hampstead, N.W., the wife of Dr. Malcolm Donaldson, of a son.
FAWSSETT.—On Dec. 27th, 1923, at Clarence House, Rhyl, North Wales, the wife of R. Shirley Fawssett, M.R.C.S., L.R.C.P., of a son.

MARRIAGES.

BOND—HILLCOAT.—On Dec. 27th, 1923, at St. Philip's Church, Leicester, Charles Eric Bond, M.B., to Janet Hillcoat.

DEATHS.

BURNETT.—On Christmas Day, 1923, at his residence, Hampstead, Sir Napier Burnett, K.B.E., M.D., aged 51.
FINLAY.—On Dec. 26th, 1923, at his residence in Jersey, Lieut.-Colonel William Finlay, R.A.M.C. (retired), aged 77.
PEDLER.—George Henry Pedler, M.R.C.S., L.R.C.P., L.S.A. (King's College and Hospital), at 80, Finchley-road (late of 235, Knightsbridge), on Dec. 23rd, 1923, aged 76.
SHAW.—On Christmas Day, 1923, at Oatlands Chase, Weybridge, Lauriston Elgie Shaw, M.D., F.R.C.P., Consulting Physician to Guy's Hospital, in his 65th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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Notes, Comments, and Abstracts.

A VISIT TO A LEPERS' COLONY.

BY SIR THOMAS OLIVER, M.D. GLASG., F.R.C.P. LOND.

WHEN in New Orleans in September last along with Dr. Oscar Dowling, President of the New Orleans Board of Health, and Judge Mawr, the District Attorney, I motored from the Southern States City 96 miles to the "leprosarium" at Carville. For nearly the whole length of the journey the road follows the course of the Mississippi, but the river is concealed from view by an unbroken line of high earthworks, or levees as they are called, raised to confine its unruly waters within limits. The road passes through corn and sugar-cane fields, beside rice beds, inundated with water syphoned from the Mississippi through large iron pipes, and here and there past a cotton field, but cotton plantations in Louisiana, compared with the sugar plantations, add little to the prosperity of the State.

On reaching the leprosarium we were received by Dr. Oswald E. Denny, a smart-looking officer, wearing the uniform of the Public Health Service, who had gained experience of the management and treatment of patients by having been in control of leprosy in the Philippine Islands, where, during the 25 years' administration of the islands by the United States, the number of cases of leprosy has fallen from 9000 to 3000.

Description of the Carville Institute.

The Carville Institute is built on the block and corridor system. On the left of the central or administrative building is a row of neat detached villas for the staff. The institution, which is run by the Federal Government, was established 28 years ago by the purchase of a large plantation. The central building used for administrative purposes was the residence of the planter. It is an elegant and well-finished wooden building, and gives evidence of having been a home of wealth and comfort. At present there is accommodation for 175 patients, but before the end of 1924 it is proposed to make room for 500. As an indication of the belief in the contagiousness of leprosy and dread of the disease, I may say that there was at the time of my visit in the institute a male patient who had committed serious crimes, and against whom the evidence was so strong that were he tried he would probably be convicted and the death penalty exacted. But he is a leper, and no judge will try him, nor will any criminal court open its doors to receive him; thus he remains in Carville untried.

There are separate buildings, to the right of the administrative block, for white and coloured patients of different sex, colour, and nationality. The Chinese, for example, are grouped together, as are the Greeks. From a hygienic and medical point of view the buildings are all that can be desired: the operating theatres, X ray rooms, chemical laboratories, and dispensaries are equipped with the latest and best materials.

On the staff are two consulting physicians, Drs. R. Hopkins and P. Howell, of New Orleans; Dr. Denny, the director; two resident physicians, Drs. H. K. Marshall and J. G. Wooley; and a dentist. Dr. Denny is also in charge of the bacteriological department, and directs and controls medical research. I was much impressed by the thoroughness with which everything is done and by the scrupulous attention to even the smallest hygienic details. In addition to an ordinary roadway between the extreme end of the wing of the official residences and the furthest ward to the right of the central block, there runs an elevated wooden platform extremely convenient in wet weather: a similar means of communication exists between the various buildings in which the patients are housed. The sleeping and living rooms of the latter are separated by corridors. The doors of the rooms are in their upper half occupied by a thin sheet of metallic gauze, useful alike for ventilation and as a preventive against mosquitoes. Of the culinary department and its annexes I can only speak in terms of the highest approbation. The lavatory and toilet system calls for a similar compliment.

The Condition of the Patients.

The patients are confined to the grounds, but these are spacious and open. Attempts to escape are seldom heard of. The patients with whom I conversed were, as far as circumstances permitted, satisfied with all that was being done for them. The worst types of facial leprosy I found among the Chinese. A few of the female patients were resting in their rooms, as some of them were the subjects of moderate pyrexial attacks, which frequently come on after midday, attended by ill-defined pains and gastro-intestinal disturbance.

The leprosarium is situated at a respectful distance from other human habitations, amid beautiful and varying surroundings, and everything is done by the medical staff and by the Roman Catholic chaplain, Father Keenan, with his 18 years of service, to make the enforced incarceration as pleasant and as little irksome as possible to the inmates. The latest addition in this direction is a brass band, which did its best to give us a kindly welcome.

To Dr. and Mrs. Denny I take this opportunity of thanking them for the sincerity of their reception and the warmth of their hospitality, and in this I include the other members of the staff.

Newcastle-upon-Tyne.

A SHORT-CIRCUITING OPERATION FOR INTESTINAL STASIS.

Dr. J. C. Watt, of the West African Medical Staff, has published in pamphlet form a study of Intestinal Stasis (London: John Bale, Sons and Danielsson), based upon the teachings of such observers as Panaroli (1654), O'Beirne (1833), Metchnikoff, and Arbuthnot Lane. He holds that intestinal intoxication is a more potent factor in producing degeneration of arterial walls than even the special syphilitic poisons; that it is usually impossible completely to clean out a relaxed bowel; and that the severer degrees of constipation are the most potent causes of many text-book diseases. Dr. Watt endeavours to combat the reluctance of the medical man to admit that any normal structure in the human body may be a source of disharmonious working of the rest. The operation which he proposed is to stitch the last part of the pelvic colon to the upper part of the rectum, afterwards crushing the intervening crest by means of forceps introduced through a transverse slit, and then dividing with scissors the crushed septum. Dr. Watt thinks that this operation would increase the power of impelling fæces at will into the rectum, and would lead to a call to stool three or four times a day. Holding, as he does, the view that stasis only occurs in the normal subject in the pelvic colon, the relief of stasis would necessarily follow. Dr. Watt does not offer experimental or clinical proof of the value of the suggested operation.

OLD ILLUSTRATED MEDICAL WORKS.

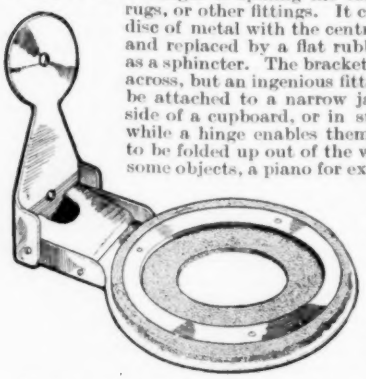
THE new Catalogue of the Internationaal Antiquariaat (Menno Hertzberger, No. 17, of 364 Singel, Amsterdam) records a number of interesting acquisitions now offered for sale to collectors and those interested in old medicine or the history of medicine. The second edition of Celsus, a small folio printed at Milan in 1481, is No. 109 in the Catalogue. This edition, by Pachel and Scinzenzeler, is far rarer than the first. It is finely illuminated, a beautiful copy, tall, clean, and "unwashed," in contemporary stamped binding. The book was not seen by Hain, and is now offered for 460 florins—i.e., something less than £46. Another exceedingly scarce edition offered for f. 325 is the "Herbarius Moguntinus," so-called because first printed at Mainz in 1484. The present edition, embodying the "De Virtutibus Herbarum," of Arnold de Villa Nova, was printed at Venice in 1509, and is one of the oldest herbals illustrated with woodcuts. The Augsburg "Hortus Sanitatis," of the year 1486, is an early printed book offered at the same price as the foregoing. This extremely scarce edition is remarkable for being one of the earliest illustrated books, and is a pioneer work in the history of botany and medicine. Hain does not mention it. John of Ketham's "De Medicina," of date 1517, is a later edition of the "Epiloga en Medicina." These editions were both printed at Seville, and the large woodcuts in the 1517 edition represent the processes of phlebotomy and the body of man and woman, while a smaller cut is a representation of two physicians with their medical boxes. The "Regimen Sanitatis," with commentary by Arnold de Villa Nova, is now offered. The date is circa 1492; it is an apparently unknown edition, the price being f. 160.

Among more modern works in this tempting catalogue we find the curious large atlas by Gautier D'Agoty, printed at Nancy in 1773, with title "Cours Complet d'Anatomie." It consists of 15 large folding plates, and is an early instance of printing in several colours. The two plates of the body of man and woman, which are nearly always lacking, are contained in this volume. The woman with a blue fillet in her hair may have been a live person known to D'Agoty, though she is displayed as if dissected. Old illustrated anatomies have, indeed, quite a human interest of their own, and the lady with the hairband might be paralleled by the well-known Albinus and Maclise illustrations, which are good examples of the figure-drawing of their day and doubtless, in many cases, represented living artists' models. In this connexion we may mention the portrait of a dead man on the reverse of the Cheselden Medal, presented in old days—if not now—at St. Thomas's Hospital. This

represented, as tradition averred, the most perfect corpse ever seen in the dissecting-room at that hospital. We are for the moment unaware if Choulant throws light on this subject. His "History and Bibliography of Anatomic Illustration in its Relation to Anatomic Science and the Graphic Arts" is now offered for f. 37.50. It is Frank's edition, printed at Chicago in 1921. Choulant published the original work in 1852.

A USEFUL BRACKET.

THE illustration shows a convenient bracket for firmly holding a tumbler of practically any size, a bottle, or other vessel, without danger of spilling the contents on cushions, rugs, or other fittings. It consists of a circular disc of metal with the central portion removed and replaced by a flat rubber ring which acts as a sphincter. The brackets measure 4½ inches across, but an ingenious fitting enables them to be attached to a narrow jamb of a door, the side of a cupboard, or in such-like situations, while a hinge enables them, when not in use, to be folded up out of the way. In the case of some objects, a piano for example, the brackets can be swung, when necessary, entirely out of sight. For invalids' chairs and ambulances these brackets should be of much utility, while for motor-cars, caravans, railway carriages, and indeed in any moving vehicle, the invention can be used with great convenience. The brackets are finished in lacquered brass, nickel plate, or oxidised metal, and are obtainable from the Burtons Patents Limited, 82, High-street, Bromley, Kent.



FINGER-PRINTS.

A WORK for the use of students of the finger-print method of identification has been written by Dr. H. Faulds,[1] who has long been known as a pioneer in this subject. In 13 short chapters it deals concisely with the history of the use of finger-prints for the purposes of identification in different parts of the world. Dr. Faulds, in 1886, after his return from Japan, where he made numerous experiments, urged the method on various authorities, including Scotland Yard, and in 1901 Lord Belper's committee recommended the adoption of the method in England and Wales, which took place in July of that year. Since that time not only the patterns formed by ridges and furrows have been studied and classified, but also the pores of the fingers and of the hand and body generally. An advocate of the newest method of poroscopy is Mr. Locard, the police expert of Lyons, who has emphasised that the permanent location of the pores gives proof of personal identity. Dr. Faulds mentions select methods and the necessary chemicals and dusting powders for bringing to view marks on black or white surfaces and objects transparent or opaque, and includes a glossary of terms and several illustrations. These include portraits in the puzzling case of the two American negroes, both named William West, who although unrelated to each other were remarkably alike in almost every detail except finger-prints, which alone saved one from being charged with the offences of the other.

COLONIAL HEALTH REPORTS.

Basutoland.

A CENSUS was taken on May 31st, 1921. The native population was returned as 495,937, exclusive of 47,141 absentees. Females were in the majority by over 50,000. The number of persons to the square mile was 48·30, as against 33·78 in 1904 and 38·97 in 1911. Europeans numbered 1603, as compared with 895 in 1904 and 1396 in 1911. Maseru, the capital and largest town, had a population of 1890 natives and 399 Europeans. The medical work of the territory continues to increase. During 1922, 42,528 patients were treated in the hospitals, and 1207 major and 1008 minor operations were performed. The cry is for more medical men, but in the present financial position of the country (writes Mr. R. B. M. Smith, the Government Secretary) it is not possible to provide them. The medical needs of the country are attended to by ten Government medical officers, two of whom are on specialist duty at the Leper Settlement, and five general practitioners, three of whom are paid district surgeons' fees for attendance at Butha Buthe, Teyateyaneng, and Mokhotlong camps. The missionaries are allowed to dispense simple remedies, but even with their help it cannot be said that the needs of the people are adequately met, though the work done with the Government's limited resources compares favourably with that of other countries. The distribution of free remedies for syphilis continues, and the missionaries who assist in this report most satisfactory results. Typhus fever has become endemic and outbreaks have been reported from every district in the country; 402 cases with 70 deaths were notified by the medical officers. The disease is of a mild nature, and many cases go unreported. It has been found most difficult to arouse the people to a sense of the gravity of the matter, but new regulations are being framed with a view to ensuring prompt notification, disinfestation, and quarantine. Small-pox was reported in all the districts except Maseru. The outbreaks were limited in extent except in Mohale's Hoek; there were in all 421 cases with 46 deaths. Influenza was fairly prevalent, 530 cases with two deaths being recorded. There were 77 cases of pneumonia with six deaths. Dysentery caused two deaths out of 89 cases. The dysentery is of the bacillary variety; amœbic or tropical dysentery is never seen except as an importation. Four cases of cerebro-spinal fever were recorded. The population of the Leper Institution on Dec. 31st, 1922, was 479 (220 males and 259 females); 87 new patients were admitted. It was noted that many were in the early stages of the disease, which is a sign that the objects and benefits of the institution are being appreciated by the people. A number came voluntarily to get admission; ten deserters were readmitted, and, from reports received, there are very few at large now. Five patients deserted during the year—by far the smallest number of deserters on record. All of them were returned promptly by their chiefs or their people, and this has had an excellent effect in the compounds. There were 68 deaths, of which 12 were due to influenza. Treatment with sodium morrhuate and the ethyl esters of the chaulmoogric acid series is being vigorously pushed and the good results obtained are expected to be continued. Improvements are being constantly made in the buildings and precincts of the compounds. Tree planting continues, and the orchards begun last year give promise of being very useful; it has been noted that fresh fruit, besides preventing scurvy, has a beneficial effect in leprosy, no doubt due to vitamin C. Dr. E. C. Long, C.M.G., principal medical officer, went on retirement on Dec. 31st, 1922, after over 32 years' service in the territory. He was succeeded by Dr. N. M. Macfarlane, deputy principal medical officer and superintendent of the Leper Settlement.

Grenada.

Mr. Herbert Ferguson, Colonial Secretary, in his report for 1922, says: "The colony, including the island of Carriacou, has a comparatively low death-rate, especially among adults, and health conditions are generally good. The death-rate for the year was 18·8 per 1000. Intestinal diseases, due to insufficient and improper feeding, are the cause of most of the deaths of children, and although remedial measures are being carried out by the Government and the District Boards, the death-rate among children is high. Of the total deaths 42·6 were of children below the age of 5 years. The death-rate of adults in proportion to the population above 5 years of age is considerably reduced, and, while not so low as in European countries, compares more favourably with the adult death-rate in temperate zones than the total death-rate indicates. Diarrhœa and enteritis caused 329 deaths (1·8 per 1000 of the population), dysentery 83 (1·2 per 1000), and malaria 83 (1·2 per 1000). There is a pipe-borne water service in all the parishes of the island except St. David's, the latter being supplied with numerous protected springs and streams. Certain lands forming the catchment area of the water-supply of St. George's have been acquired by the Government in order to prevent pollution. The water-supply of the island of Carriacou is obtained from wells and from rain-water stored in cisterns. The climate of Grenada can be classed as excellent, especially from December to May, when it is delightful. The trade-winds are steadily prevalent during this period, but occasionally fail in the autumn months, which are somewhat damp and hot. The range of temperature is small and tends to make the climate equable and healthy. The thermometer seldom reaches 90° F. in the shade, or drops below 70°, and these occasions occur so rarely that they are specially recorded in the meteorological notes of the year. The highest temperature in 1922 was 90° and the lowest 68°. The mean of maximum temperatures was 83° and the mean of minimum 73°. The rainfall varies according to altitude.

[1] A Manual of Practical Dactylography. By Dr. Henry Faulds. London: Police Review Publishing Co., Ltd., 8, Red Lion-square, W.C. Pp. 68. 2s.

WE have received from the Laboratory of the Products "Usines du Rhone," 21, Rue Jean Goujon, Paris (8e) (Distributing Agents: Messrs. Dick, Coates and Co., 41, Great Tower-street, London, E.C. 3), a useful desk-block calendar for 1924, with a page for each day, on the well-known continental loose-leaf principle, on which reference to future or past dates is equally prompt and easy.